parts, Transbaykal has a generally regular shape. Numerous mountain 133
ridges traverse it in strikingly parallel strips from southwest to northeast. Extended mountain ridges and almost equally long valley depressions constitute the distinguishing features here, while the contrast between mountains extending irregularly and lowlands lying in between is characteristic of the Amur and Ussuri areas and also of the extreme northeast.

Transbaykal, lying between heavily forested, damp Siberia 133
and the dry steppe belt of upper Asia, forms a transition area in terms 137
of its landscape. The Mongolian steppes, which in strips are semi-wastelands, cross the border from the south and in long tongues stretch into the broad valley plains between the mountain ridges. In this fashion the steppes reach even Lake Baykal and form islands in the middle of the wooded area, for example on the Barguzin River and in the valley of the Upper Angara. On the other side the Siberian taiga presses in on mountain ridges far toward the south to the area around the upper course of the Onon and the Ingoda. Thus the Central Asiatic steppe and the north Asiatic continental forest penetrate into Transbaykal. There comes into being a magnificent forest steppe landscape. In the south the steppe predominates, but the farther north one goes the more the forest descends the slopes from the rounded-off mountain ridges until finally the forest fills the ever narrowing valleys. The steppe valleys gradually become grassy meadows, which finally turn into swampy valley meadows and even into swamp forest in the north.

The ground relief in Transbaykal, however, is not so varied 133
as would appear from first glance at the map. The valley plains lie generally 600 to 900 meters above sea level, and the ridges of the mountain chains are between 1,000 and 1,400 meters high, so that accordingly there is only a relatively slight difference in height. And even this is blurred by the fact that the slopes are contiguous and rise only very slowly and gradually. As a rule they show no strongly marked ridge but more often have a long, rounded ridge, indeed often in the form of a plateau. In this the predominant forest covering contributes to leveling the unevenness of the relief. Individual mountains, in their considerable absolute heights, extend beyond the tree line. Mostly there are roots, which have withstood the storms and which with their naked round forms project like bare skulls above the general /28/ thicket of trees. The appearance has brought to them the appropriate Russian name of "gol'tsy" (singular

height are greater; for in the Amur country the bottoms of the valleys sink to between 500 and 200 meters, while the mountain ridges still retain heights between 1,000 and 1,500 meters. The number of mountain ridges, which retain their rounded-off, plateau-like character with numerous "gol'tsy" /29/ set on them, decreases. Likewise there disappears the parallel lining up of the main chains in a northeastern direction, a trait which is so marked in Transbaykal. The main mountain chains in the Amur country, on the contrary, run predominantly from west to east, while others cross them almost at right angles. Thus, in contrast to Transbaykal, the geological features have greater dimensions here, where broad plains are inserted between the individual mountain chains, and toward the Amur these plains assume the character of low plains. The thickly settled Zeya-Bureya Plain should be mentioned first. But here too the corresponding traits appear which--apart from the mountains--are expressed in the main direction of the rivers and their valleys. A southwest-northeast direction (like Lake Baykal), such as occurs in the course of the Argun, the Selemdzha, the Bureya, and the lower course of the Amur, crosses a northwest-southeast direction, which appears most clearly in the middle course of the Amur and in the direction of the Gilyuy. Many rivers, such as the Zeya, follow first one direction and then the other.

The difference in the landscape from Transbaykal is great since the Pacific Ocean has a powerful effect on the Amur country which lies in the sphere of the east Asiatic monsoon. The nearness of the great continental mass, to be sure, brings harsh winters; but the summer is warm and brings at the same time heavier rainfall than in Transbaykal. Generally the annual rainfall is more than 500 millimeters, of which usually more than half falls in the three summer months of June, July, and August alone and brings forth a most luxurious plant growth. While in Transbaykal the valley areas remain free of tree growth because of the dryness, here there is excessive dampness, which makes it impossible for forests to thrive in the valleys, meadows and level areas. This excess of summer rain gives the landscape its special stamp. Swampy reed thickets along the rivers, broad meadowlands covered with high grass and lying on the higher plains, giving way to little woods on the dry hills, and on the slopes and ridges of the high mountain chains forest thickets often difficult to penetrate and, in contrast to the Siberian taiga, containing oaks and deciduous trees--these are typical of the entire Amur country.

The excess of dampness in vegetation season is a handicap

311 The excess of dampness in vegetation season is a handicap even for agriculture and makes difficult the extension of the cultivated areas. New land for cultivation must as a rule be won laboriously from nature by drying it out. More and more the extended Zeya-Bureya Plain and the area along the Amur have become quite thickly settled, and large parts of the famous "Amur [162] Prairie" have been transformed into cultivated land. It is predominantly Russians who live here. The Chinese who immigrated here earlier have been pushed back over the Amur--in part by force. In all the rest of the area, however, /30/ untamed nature dominates the landscape, which is traversed at most by a few Tungus or Russian hunters. A wealth of gold has lured numerous Russians into this 316 wasteland, too, especially in the area around the upper courses of the left tributaries of the Amur. A locally very active gold industry has come into existence, which today is organized by the state and which has drawn even this distant region into the economy.

133 The Ussuri country is divided into two completely different parts: the huge mountain mass of the Sikhote-Alin', which fills the entire area from the Bay of Peter the Great in the south to the mouth of the Amur in the north; and the Ussuri-Khanka lowlands, which extend west of the Sikhote-Alin' in the same direction and continue south of the Khanka Lake without marked interruption as far as the Bay of Peter the Great.

The Sikhote-Alin' is a forest-covered, strongly valleyed /zertaltes/ mountain mass, which is divided into several ridges running parallel to the coast. The shapes of the mountains are soft without especially marked edges and projections. More often plateau-like shapes predominate here, too. The heights in general lie between 650 and 850 meters; the valleys, however, are deeply carved out. Rising slowly from the west, the mountain mass descends steeply to the sea and only rarely leaves free a narrow coastal indentation plain on which there arises small, poverty-stricken fishing villages. The nearness of the sea crossed by a cold stream causes a cool, foggy, rainy, unfriendly summer, thus producing similar conditions to those found on the entire coast extending to the north beyond Okhotsk. Swampy valleys and forests dripping with a cool dampness and with a more northern stamp are typical marks of this area.

132 The western side of the Sikhote-Alin' and the Ussuri-Khanka lowlands, on the other hand, correspond more to the Amur •137 country. Warm to hot summers joined with high rainfall and a

strong inclination to marshiness are distinguishing marks for this area. 132, 137
The Sikhote-Alin' stretching parallel to the coast keeps back the coolness and also the fog from the sea and allows the sun to have a stronger effect. Everywhere the more southerly position makes itself apparent. In the forests of Sikhote-Alin' deciduous trees appear more and more in the foreground, increasing toward the south, until finally, in magnificent specimens, they form the sole type of tree.
n the cultivated zone, too, which stretches along the entire lowlands, 311
typically Manchurian-Chinese plants become noticeable in increasing [241]
measure toward the south. Kaoliang and other millet, soya beans, and rice appear noticeably on the scene. There is a change in the 162
population, too. In the northern part of the lowlands, as far as Khanka Lake, Russians and Ukranians predominate; in the extreme south, Chinese and Koreans are in the majority. The Ussuri-Khanka lowland is relatively thickly settled, the Sikhote-Alin' itself, on the [316]
contrary, is in large areas as good as uninhabited, except for some mining areas in the south, where /31/ coal primarily is mined. Native Tungus traverse the Sikhote-Alin' in smaller numbers than in the old days, and in addition there are Russian hunters and Chinese collectors, who are looking for secret, legendary plants.

Sakhalin Island stretches over 950 kilometers in a meridional 131
direction. The southern part is traversed by two parallel mountain ridges, which are separated from one another by a relatively wide depression. The eastern mountain chain is shorter but higher, and its peak of 2,013 meters is the highest elevation on the island. Toward the north the mountain ridges flatten out and give way to a hilly plain. The cool, foggy air masses blow unhampered over the land here, while in the south a difference in climate is caused by the mountain chains. The eastern slopes are cool, rainy and unfriendly, while the western side appears somewhat milder. The southern parts of the island, which were Japanese from 1905 to 1945 and only now have again become Russian , are generally more favorable. In terms of its landscape, Sakhalin can be designated a damp, cool, forested mountain country, but in numerous places treeless moss steppes appear, which recall the tundras of the north. Once feared as a Russian prisoners' colony, Sakhalin is advancing economically more and more because of its petroleum and coal resources.

The Okhotsk coastal area begins at the Uda Bay and encom- 133
passes, in a narrow coastal strip, the Sea of Okhotsk as far as Penzhina Bay in the extreme northeast. In the western part, which stretches

133 from the Uda Bay approximately to the harbor of Okhotsk, the mountainous rampart of the Dzhugdzhur runs parallel to the coast, to which the mountain descends steeply and abruptly. Only seldom does a narrow coastal margin offer an opportunity for establishing a fishing settlement. The way from the coast into the interior of the land is extremely difficult, for only narrow river valleys, etched out like ravines, are available for this: these rivers hasten over their short course into the sea from the ridges of the mountain rampart. For this reason Ayan, the sole harbor on this coast, can't develop. Only near Okhotsk does the foreland broaden into a coastal plain and offer easier routes into the interior of the land. The eastern part of the coastal region from Okhotsk to Penzhina Bay is, on the other hand, very much broken up and has numerous peninsulas and off-shore islands. Here the spurs of various mountains run into the coast almost at right angles, and in between extended, gently rising valley areas extend into the interior. The manifoldness of the formations is increased more by a mountain chain which, running parallel to the coast, appears only in the peninsulas. In terms of its landscape the coastal area presents the same face everywhere. Thick forests cover
133 the slopes and fill the deeply cut-out valleys of the numerous rivers
● 137 and brooks, most of which are short and which flow into the sea. On the higher tops and mountain ramparts, however, tree growth can no longer develop. Crippled shrubs or /32/ more often moss blankets cover these areas, while the highest projections, like bare gol'tsy, extend beyond the vegetation line.

From the northeastern end of Penzhina Bay a broad lowland extends to the northeast into the interior of the land and continues into the Anadyr' lowland, interrupted only by a narrow watershed-crossbar, which is at most 500 meters high. The Anadyr' lowland opens to the east on the Bering Sea. Both the Penzhina and also the Anadyr' lowlands are very much broken up by numerous mountain and hill ridges projecting into the lowlands. In terms of landscape they both have the same stamp. In the higher areas between rivers broad moss tundras cover the land. However, large poplar forests extend to the rivers, and these forests turn into fir-pine forests in the mountainous border areas beyond the upper courses of the rivers. In general one can consider the landscape to be a wooded tundra.

133 In the north the Anadyr' area is adjacent to the Chukchi Peninsula. Although the peninsula's coasts are very well explored, its interior is still fairly unknown. Two rubble-covered mountain

chains traverse it from west to east, and these mountain chains with their spurs in part reach the coast, where they break off sharply. But this area also does not lack plains, for plains extend from the coast into the land on both sides of the rivers. 133

All these areas[1] are either very little settled or are completely uninhabited. Of the Russian coastal settlements only Okhotsk and Magadan as harbors have a certain importance. Worthy of note is the reindeer breeding of the Chukchee on the peninsula named after them. 311

South of the Anadyr' lowland rises the Koryak Range, which fills the entire area as far as Korff Bay. Some mountain ridges, only a little separated from one another, traverse the land in a wide arc from the southern end of the Anadyr' Bay in the direction of the Kamchatka Mountains. Only near the coast have the rivers dug out deep valleys; here forest growth appears, while the high areas and the ridges are covered by pure tundra. 133 [137].

The coast of the Bering Sea has numerous native and Russian fishing settlements; the hinterland, on the other hand, is occupied only by small Paleoasiatic remnant peoples, who pursue reindeer breeding. [361]

Kamchatka Peninsula is one of the most interesting regions in the Soviet Russian Far East. The relief, which just like Sakhalin gets its main characteristics from two mountain ridges, is extraordinarily varied, for numerous young volcanos are set on the mountain ridges, and a number of these volcanos are still active. The Klyuchevskaya Sopka, the highest volcano on the peninsula, rises from the valley of the Kamchatka River to a height of 4,775 meters and makes an imposing picture with its ice-capped peak. Because of the abundant rainfall and the mild climate, the plant covering of the peninsula is very luxurious. On the outer mountain slopes deciduous forests predominate, only /33/ in the interior of the peninsula do fir-pine forests appear. The only exception on a larger scale is the west coast, on which tundra-like moss steppes have developed. In addition to numerous Russians who occupy primarily the coastal fishing villages, the Paleoasiatic Koryak and Kamchadal have remained in the interior. 137 162 361

The volcano belt of Kamchatka continues toward the south in the island chain of the Kurils, which after World War II went to the Soviet Union along with the southern half of Sakhalin Island. 133

1 [i.e. the Okhotsk coastal area and the Anadyr' area -- Analyst]

132 Ulan-Ude. As a consequence of the slow change in temperature of the water in Lake Baykal, the extreme months are postponed--all remarkable signs, which are reminiscent of an oceanic climate.

Within Transbaykal the Yablonovyy Range forms a climatic dividing line, which is expressed less in the meteorological data than in the plant covering which reflects the entire climatic conditions far better than the best instruments can record them. East of the [37] Yablonovyy Ridge deciduous trees appear in larger numbers. This shows, therefore, that the influence of the East Asiatic monsoon extends as far as here, and this is also confirmed by observation of the frequency of the change in wind directions. While in Ulan-Ude northwest and north winds rule absolutely the entire year, the frequency of these wind directions decreases significantly in the summer in Nerchinsk, where northeast and east winds appear above all.

The remaining regions of the Far East, as has already been said, stand in their climatic conditions in almost complete dependence on the seasonal change in air streams. The winter land winds bring down to the coast a high degree of coldness connected with dryness. But the summer sea winds, too, are disproportionately cool. In this connection the eastern border seas play a very disadvantageous role for the entire Far Eastern coast. The Sea of Okhotsk should be mentioned here in first place. It is a mighty cold water basin and is with justice designated the "ice cellar of east Siberia." The Kuril barrier hinders an exchange of water with the open ocean, and accordingly the water in the Sea of Okhotsk remains disproportionately cool (10°) even in summer under the continuing influence of the winter cooling-off by the surrounding land masses. In addition there is a cold ocean stream which stretches from north to south along the coast and even in summer carries great ice floes toward the south, /61//Map of the Reduced Mean Temperatures for the Month of January:/ /62/ where piled-up ice can be encountered even in July and August in the region of the Shantar Islands. In the Bering Sea and in the Sea of Japan, too, cold ocean streams move along the coast toward the south and lower the summer air temperatures not only through the water's own coolness but also through the formation of fog, which is a typical phenomenon for wide areas on the Far Eastern coast. Thus the general disadvantage of the east side of northern continents is especially marked here in the Soviet Russian Far East. Vladivostok (43° 07'N latitude) has the same July temperature as Moscow (55° 56'N latitude). Vladivostok lies at the same latitude as Nice but has a mean temperature for January of

-15.1° versus Nice's of 8.0°, and in July Vladivostok's temperature is 18.9° versus 23.2° in Nice. This disadvantage of the Soviet Far Eastern coast is shown especially forcefully if it is compared with the climatic conditions on the western coast of North America: 132

Mean Temperatures of the Soviet Far Eastern Coast and of the North American West Coast in Degrees Centigrade

Place	Latitude	Annual Mean	Coldest Month	Warmest Month	Annual Variation
Ayan	56°03'	- 3.9°	- 20.4°	12.4°	32.8°
Sitka	57°01'	+ 5.3°	- 1.0°	12.6°	13.6°
Nikolayevsk	53°02'	- 2.3°	- 23.4°	16.8°	40.2°
Tongass	54°08'	+ 8.1°	+ 1.1°	15.1°	14.0°
Vladivostok	43°02'	+ 4.3°	- 15.1°	20.8°	35.9°
Umqua *	43°07'	+ 11.4°	+ 6.8°	15.5°	18.7°

*/sic: probably is the Umpqua River in Oregon, which lies at this latitude/

The unfriendly influence of the Sea of Okhotsk, however, is limited more to the coastline since the mountain chains running parallel to the coast prevent a further penetration into the interior of the land, and accordingly the warm summer sun has more effect. As a result of this the division into climate areas on the coast is in contrast to the other climate areas.

The Amur-Ussuri Climate Province lies more landwards and comprises the region of the middle and lower Amur and the valley of the Ussuri. The Sikhote-Alin' and the Bureya Mountain Ranges protect these regions in the summer from the foggy and damp-cool air masses of the sea. Instead warm and damp winds coming from the southeast and south move over the broad plains of Manchuria and beyond the Amur to the north and effect a warm and damp summer in contrast to the continental harsh and dry winter.

The favorable conditions of this climate region[1] are expressed strikingly in the vegetation, which is characterized by the appearance of deciduous trees such as oaks, elms, lindens, and other, trees which are lacking in all of Siberia and also in Transbaykal and on the coastal edge. [137]

The annual rainfall exceeds 500 millimeters in the entire area but understandably decreases from the coast toward the interior

/63//Map of Mean Annual Rainfall:/ /64/ Thus Bikin

1[i.e. the Amur-Ussuri region -- Analyst]

132 within 24 hours. These conditions, especially the paths of the cyclones, have still not been clarified in detail. The real rain period does not begin until early in July and lasts until the end of August. During this period there is rarely a week without several days of rain.

In addition to the already mentioned downpours, rainfall also occurs in the form of land rains. A very characteristic type has been designated as "subsequent rain" /Nachfolgeregen/ by Arseniev. This occurs when after a storm the day is sunny and still, and then in the evening rain falls again because of the condensation of the rising, very high humidity.

The abundant rainfall of summer causes the rivers to swell, and their high water occasionally spills over the banks, and often interrupts all traffic. In many places the water cannot flow off right away. It remains standing on the level fields. Grass areas turn into swamps. In the low, broad plains on the left side of the Amur, above [312] Khabarovsk, plains which were supposed to have been won for agriculture to supply the rapidly growing city, a large-scale system of drainage canals had to be created, not only in order to drain the ground but also in order to give the rainfall an easier opportunity to drain.

132 The great dampness along with the great heat endangers and decreases 241 the harvest of European types of grain. The grain shoots into grass but the corn yield is slight. The sprouting of the plants suffers from the dryness, while the blooming, ripening, and harvesting fall in the rain period. In this the dampness of the ground /66/Climate Diagram: Ulan Ude; Chita/ also plays a role, for, according to many reports, the yield of the grain fields in the hilly country on the mountain ridges and slopes is higher than the yield of the fields in the valley areas. The softening of the ground by the summer rains makes the use of machinery difficult, and this appeared as a restraining factor in the establishment of the kolkhoz system and the MTS (Machine Tractor Stations). In part steps had to be taken toward the construction of new machines. On the other hand

132 the climate fosters the development of vermin and fungus. The corns of grain are not uncommonly attacked by a spore fungus (Fusareum •137 roseum), which makes the bread "pianyi," i.e. drunken, as the Russians say, because when eaten it has an intoxicating effect and causes nausea. Fruit is distinguished by richness in liquid but by a poverty of sugar. The Manchurian-Chinese cultivated plants and the natural native plant world thrive especially. Characteristic for the forests is a rich underwood, but the trees--and this applies especially to the deciduous trees--are very susceptible to disease, often becoming hollow with internal

132 rot, and they are generally short lived. The usual leather boots are
137 scarcely to be used when going into the summer-damp woods, since they soften up in the damp ground covering and disintegrate.

132 The best time of the year is autumn, lasting through September October. It no longer rains. The sun shines brightly from a blue sky and in the almost complete calm emits an agreeable, bearable warmth. Once the frost comes, it lasts through the entire winter. It is seldom interrupted by a spell of thaw. The great dryness of the air is remarkable, even snow often evaporates.

/67/ /Climate Diagram: Blagoveshchensk; Vladivostok./

The coastal climate dominates the entire coastal strip from Vladivostok in the south to the north beyond Okhotsk. Because of the coastal strip's variations in width there are climatic variations between individual sections, but only in a gradual sense. It is useful, however, to divide the area in two, and to treat the southern coastal area separately from that of the north.

To the southern coastal area belongs the area from Vladivostok to the mouth of the Amur River. The hinterland is occupied in its entirety by the Sikhote-Alin'. Its principal chain acts as a climatic dividing line in summer and in winter. Despite the proximity of the ocean, the winter on the coast is marked by continental severity. It is more severe in the north, where a solid sheet of ice is formed between the mainland and Sakhalin Island, than in the south, where only a thin crust of floating ice is formed at the coastline. The entire coastal strip is subject to the cold, continental air masses pushing toward the sea. Nevertheless, temperatures on the coast are not as low as west of the Sikhote-Alin'. For one thing, the masses of air are forced down on their way to the sea, and this causes the temperature of the air to rise. Then there are also in-blowing winds, coming from the open sea, blowing even in winter, which contribute to the raising of the average temperature. In contrast to the winters, the summers of the coastal area show the characteristic traits of a maritime climate. The cool masses of air blowing inland from the sea are further cooled by the cold coastal current and contribute considerably to the lowering of temperatures in the coastal area, whereas to the west of the Sikhote-Alin', the influence of the sea on air temperatures is hardly perceptible anymore. The extent /68/ /Climatic Diagram: Okhost; Petropavlovsk/to whichthe Sikhote-Alin' acts as a climatic dividing line in relation to temperatures is demonstrated in the contrasts between the two localities Ol'ga and Voroshilov (formerly Nikolsk Ussuriyskiy), both on

132 tinental cold air front forces the paths of the cyclones toward the south and southeast, and accordingly their activity is limited more to Korea and the eastern part of the Sea of Japan and scarcely touches the Soviet areas.

The World of Plants

• 137 The vegetation, too, can be divided according to the climatic provinces. However, here the vegetation has not shaped special formations of its own, but rather has a general transitional character. In Transbaykal the Siberian taiga turns into the Mongolian steppe vegetation, and on the Amur and Ussuri typically Manchurian plants extend beyond these rivers and intermix with representatives of the Siberian evergreen woods. Only in the region of the coastal climate have some special forms of the plant world developed which are peculiar to this region alone.

/94/ In Transbaykal the steppe vegetation penetrates very far toward the north. Often it appears in islands in the middle of closed forest regions. In the valley of the Upper Angara we find feather grass (Stipa pennata) and fescue grass /Schafschwingel/ (Festuca ovina) as typical representatives on the southern slopes, while the northern slopes are covered with thick larch and pine forests. In the valley of the Barguzin feather grass and artemisia steppes are spread out not far from one another. Also the well-known Nerchinsk Steppe, better designated, however, as a forest steppe, is an island closed off in itself and approximately 100 kilometers long and just as wide. In general the character of a meadow steppe predominantes here, but in lower areas salt ground appears with numerous xerophilous plants. The steppe, however, attains its greatest area, here closed off, in the southeast between the upper courses of the Argun and of the Onon. This Argun Steppe begins in the north as a meadow steppe and turns toward the south into an artemisia steppe, which already gives the impression of being a semiwasteland. West of the Onon the pure steppe appears only in spots, and only in the Selenga area does it have a significant size. Here, between Novo-Selenginsk and Troitskosavsk /now: Kyakhta/ lie alluvial sands, which are often laid bare and which show an almost wasteland character with wandering dunes /Wanderdünen/ and inlaid Salzpfanne /salt pans/.

The ground relief is of decisive importance in determining the extent of the forms of vegetation in detail. The steppes as a rule re-

main in the valley areas at a height from 500 to 900 meters. Adjoining them are the forested steppes up to 1,200 meters, consisting predominantly of birches. Here thick forests with evergreen trees begin. In south Transbaykal the upper timber line lies at a height of 1,700 meters to 1,900 meters; in the raw north, however, it lies significantly lower. There the forest often ends already at 1,200 meters; but, on the other hand, it goes down farther, and on the northern slopes it penetrates to the banks of Lake Baykal.

The forests west of the Yablonovyy Ridge consist of the same types of trees as appear in all of east Siberia. The Daur larch /Daurische Lärche/ (Larix dahurica) is the principal tree. Associated with it is the Siberian cedar or Siberian stonepine (Pinus cembra), which in higher places even exceeds the larch. The Daur larch appears also with the pine (Pinus silvestris) on drier, sandy ground. The Siberian spruce (Picea obovata) and the Siberian fir (Abies sibirica), on the other hand, appear more rarely. The Siberian larch appears only in a small area west of the Selenga. How much the vegetation is influenced by the height of the land is shown by the 2,508-meter high Sokhondo just on the Mongolian border. Here the forests begin at a height of 1,200 meters and extend up to 1,900 meters, and consist of the same types of Siberian trees mentioned above. In one thing, however, the Transbaykal forests differ from the Siberian: in the thicker underbrush, which consists principally of rhododendron and bush birch /Strauchbirke/ (Betula Middendorffi).

/95/ Above the forest line a peculiar bent wood vegetation /Krummholzvegetation/ sets in, which is extremely characteristic not only of these high areas in Transbaykal but also of all the other regions. Principally represented here are the dwarf pine (Pinus pumila), the dwarf birch (Betula Middendorfii morphe alpina), the Cassiope (Cassiope ericoides), rhododendron (R. chrysanthum), and a dwarf form of the Daur larch (Larix Daurica var. pumila). This bush formation, which can be as high as 3 meters, is so overgrown and matted that it seems impossible to penetrate it.

An Alpine meadow region is lacking in Transbaykal. Mosses and lichens go from the bush vegetation as a rule right to the bare stone of the Gol'tsy.

East of the Yablonovyy Ridge the forests generally retain the same character as in the west; however, here the first deciduous trees appear as harbingers of the more temperate zones of east Asia: thus oaks, elms, and apple trees appear here. For the Russians, who missed

137 deciduous trees on the long way to the east from the Urals and who saw them again here for the first time, this sight may have been a true joy: accordingly they named the mountain ridge on which they first encountered wild apple trees, the Yablonovyy Khrebet, i.e., "Apple Mountain Range."

The forests of the real Far Eastern regions consist of three main elements: the east Siberian, the Okhotsk, and the Manchurian. The east Siberian element is represented by Daur larch. The Ayan spruce /Ajan-Fichte/ (Picea ajanensis), the stone birch /Steinbirke/ (Betyla ermani), and the fir with the white bark (Abies nephrolepis) are characteristic of the Okhotsk type of forest. This type of forest is limited to the damp-cool coastal region. In the basins of the middle Amur and of the Ussuri and in the southern Sikhote-Alin' we find the third type, the Manchurian, which is distinguished by a wealth of deciduous trees--oaks, maples, ashes, lindens, and others--and by an abundance of types of trees.

The mild climate of the Amur-Ussuri region already allows the broad-leafed deciduous trees to come into the foreground in the vegetation picture; indeed, in wide sections, these trees even attain predominance.

From the northern arc of the Amur, the east Siberian taiga entering here gradually changes its face toward the east, and becomes a mixed forest in which, at Blagoveshchensk, deciduous trees already outnumber the others. The oak (Quercus mongolica) should be mentioned as a characteristic tree, and soon lindens (Tilia amurensis and Tilia mandschurica) accompany it, as well as maples (Acer ginnala), and numerous other deciduous trees. Also a similar change takes place from the Stanovoy Ridge south to the Amur. The pine (Pinus silvestris), the most loyal tree of north Eurasia, which asserts itself from Europe to the Sea of Okhotsk, despite all differences in climate, finds its outer limit on the lower Amur. Likewise /96/ the Siberian spruce (Picea excelsa obovata), a variety of the European Picea excelsa, finds its extreme eastern limit here.

Characteristic of the deciduous forest areas of the Amur country is the Lespedeza (Lespedeza bicolor), which often covers all the ground in clearings or in burned-off areas. Although not as nourishing as lucerne /alfalfa/, it nevertheless constitutes an excellent food for livestock. On the Amur and especially in the Zeya-Bureya Plain there are extensive grass lands, which are also designated the "Amur Prairies." Near the rivers blue grass (Calamagrostis Langsdorffi) pre-

dominates. However, steppe elements also appear on these plains,--137
steppe animals as well as plants--for example the typical steppe grass Stipa capillata and the Nager Suslik (Citellus Eversmanni jacutensis). In swampy river valleys, especially on the Bureya, there are swamp forests consisting of poplars (Populus suaveolens), lindens (Tilia cordata amurensis), the Manchurian nut tree (Juglans mandschurica), and others. These flood forests are distinguished by an extraordinarily thick and peculiar underwood with numerous climbing plants. Of these, special mention should be made of the mighty Manchurian wine grape (Vitis amurensis) which grows in the Amur area as far as 51° North and as far as the Zeya on the west. The stem of this plant is up to 15 centimeters thick; its sweet black grapes are collected by the population and used to make wine or marmalade.

In the Ussuri country the vegetation puts on a completely Manchurian face. In contrast to the Siberian taiga which has only a few types of trees, here the extraordinary multiplicity of the plant world surprises the explorer. Komarov points to 64 types of trees, 79 types of bushes and 15 types of lianas here. It may be of great significance that these regions never experienceed an Ice Age, and accordingly representatives of Tertiary flora have been able to remain until today. In the Ussuri depression and in the valleys of the southern Sikhote-Alin' deciduous trees completely dominate the field. In the south, Korean and Japanese types of trees join with the Manchurian types. In addition to the deciduous trees already mentioned, the following can be mentioned as characteristic: the following types of maple--Acer barbinerve, Acer mono, Acer tegmentosum, Acer ukurunduense; the alders--Alnus fruticosa, Alnus japonica, Alnus incana; the pear trees--Pirus ussuriensis and Pirus sinensis; the mountain-ashes--Sorbus aucuparia, Sorbus sambucifolia; and the Amur elder, Syringa amurensis. Worthy of mention are the east Asiatic cork tree (Phellodendron amurensis), with its peculiarly soft bark, the white walnut (Aralia mandschurica), and the palm-like dimorphic plant (Dimorphantus mandschuricus).

In the higher regions of the Sikhote-Alin', on the other hand, coniferous trees again step into the foreground. The Daur larch appears everywhere. Appearing anew are the Manchurian cedar (Pinus mandschurica), which is concentrated more on the coasts, the spruce (Pinus funebris), and, on the east coast, the Olga larch (Larix Olgae). The 20-meter tall yew tree also /97/ appears occasionally (Taxus cuspidata). Junipers are to be found everywhere, and in higher regions they often cover whole areas with a creeping type of juniper (Juniperus

137 daurica). In the Sikhote-Alin' the three types of Far Eastern forests often meet in a tight area. The Manchurian element fills the valleys and slopes but never extends beyond 750 to 1,000 meters above sea level; following this element is the Okhotsk taiga, and following this in turn is the Siberian type with the Larix dahurica /Daur larch/. The heavy rainfall and the great warmth in the southern part of the Ussuri region give the water plants especially favorable opportunities to develop. Therefore there flourishes here also the lotus flower (Nelumbo speciosa), the Brasenia (Brasenia purpurea), which also spread into Europe in the Pre-Quarternary period, the water nut /Wassernuss/ (Trapa incisa), and in some places the water rose /Wasserrose/, Euryale fevox, whose great leaves attain a diameter of up to 130 centimeters.

In contrast to the Amur-Ussuri country, the vegetation of the coastal area shows a different, more sharply drawn picture. The hardy and perennial Daur larch, which penetrates to the Polar tree line in northeast Siberia and extends toward the south as far as into the Sikhote-Alin', avoids in a remarkable fashion the sea coast of the east with its damp and cool winds and appears first at some distance from the coast. The entire coastal country, therefore, is taken up by a special type of conifer forest, the Okhotsk taiga. There are mostly spruces, firs, and birches, which here grow thickly on the slopes to the sea coast. The typical trees are the types already mentioned: Ayan spruces, stone birches /Steinbirke/, firs with white bark. The Okhotsk taiga spreads along the coast of the sea by the same name, but it also takes in the area around the mouth of the Amur, and also dominates the part of the northern Sikhote-Alin' inclined toward the coast. It is, therefore, especially suited to the raw coastal climate. The mighty sea winds, however, do not permit a continuous extention of this taiga. Thus it covers above all the slopes and valleys, where it develops an extraordinarily thick growth which is difficult to penetrate. Toward the mountain ridges this taiga gives way very quickly to the usual bent wood /Krummholz/ vegetation, and adjoining this in turn is a moss and lichen formation, which covers the bulk of the ridges exposed to the winds and serves as an excellent summer meadow for the reindeer breeders. In the Dzhugdzhur almost all the passes which lead from the coast into the interior lie above the timber line, and this hampers their usefulness, especially in winter.

Kamchatka's vegetation picture corresponds generally to the Okhotsk type but it is changed somewhat by the milder climate and the relief. The stone birch /Steinbirke/ (Betula ermani) is the typical

tree here, being completely dominant on all the slopes inclined toward the sea--both the Sea of Okhotsk and the Bering Sea; accordingly there is an overwhelming impression of a forest of deciduous trees. Only in the interior, where the continental climatic traits predominate, is the /98/ east Siberian taiga with the Daur larch preserved under the protection of the two mountain ridges. The higher mountains projecting beyond the tree line are again covered with a bent wood vegetation /Krummholzvegetation/, which is especially thick on Kamchatka and which often makes wide areas almost impenetrable. Along the west coast a tundra-like moss steppe has developed, which covers the northern part of the peninsula across from west to east. In contrast to the conditions which become more unfavorable toward the north, the vegetation increases toward the south both in abundance of growth and in types. Worthy of note is the appearance here of the Japanese birch (Betula japonica) and of numerous higher types of grass, such as Heracleum tanatum and Heracleum dulce, and the wide diffusion of the bear root /Bärenwurzel/ (Angelica ursina), which becomes up to three meters tall. The appearance of extended forest meadows in the southern part of the peninsula has also caused the introduction of cattle breeding. 137

The regions of the extreme northeast can generally be designated as tundra or forest tundra.

The World of Animals

Following the pattern of the natural vegetation set-up, the animal world has the same juxtaposition of the most varying forms. East Asiatic and Inner Asiatic types join with the Siberian types. In the land once famous for its wealth of wild animals, an unbelievably rapacious economy /Raubwirtschaft/ has either destroyed the useful wild animals or driven them into inaccessible regions. Nevertheless, the regions still little touched by man are extraordinarily great, and there the animals have been able to preserve themselves in all freedom and in great numbers. 136

Numerous rodents, which are especially characteristic of steppe regions, are native to the forest steppes and steppes of Transbaykal: for example, the "suslik," the ground squirrel (Citellus Eversmanni and Citellus dauricus); the "tarbagan," a type of woodchuck (Arctomys bobak), the earth hare or jumping hare /Erd- oder Springhase/ (Alactaga saltator mongolica), and others. Larger steppe animals,

311 Approximately 65 percent of the forests consist of wood ready
137 for cutting, i.e. the trees are over 100 years old. These and the above figures should be regarded as only estimates; for a large part of the forested area has neither been investigated nor has a count of the supply in the forests been made. What large tasks are still to be resolved here and also in the other Far Eastern regions is shown by the figure given by V.F. Panayev for the year 1936: he said that at the time only 18.4 percent of the total forested area in the Buryat Mongol ASSR had been explored. (12)

12. Problemy Buriat-Mongolskoi ASSR /Problems of the Buryat-Mongol ASSR/, Works of the First Conference for Exploring the Productive Powers of the Buryat-Mongol ASSR, 2 vols., (Moscow-Leningrad, 1935-36), Vol. II.

313 The use of the wood is determined in terms of area by the development of transportation. The exploitation of the forests is limited to the area of the Selenga and its tributaries, which carry down the cut wood for the most part to Ulan-Ude or Il'inskoye for processing. The forests are also exploited in the regions near the shores of Lake Baykal, where wood processing industries have arisen at the mouths of the Barguzin and of the Upper Angara. The most important plant in this area is in Mysovsk /now: Babushkin/, where a great lumber works with sixteen saw sashes is situated /saw frame/. The railroads should also be mentioned as the last supplying line for exploiting /171/ the forests, while all the remote forests still remain in their natural state.

311 In Chita Oblast the forest conditions are similar, but here the
313 percentage of actual forest is somewhat greater than in the Buryat-Mongol ASSR. The exploitation of the forests is limited to the regions near the railroad and to the areas neighboring on the Amur and its tributaries. The main processing centers are Chita, Khokhotuy, and Bada.

311 The percentage of forested areas in the other Far Eastern regions appears slight, being 37 percent for the forested areas and 21 percent for areas actually stocked with trees. This is explained by the fact that to these regions also belong the areas of the northeast, such as the Chukchi and Koryak peninsulas, the Okhotsk coastal area, and Kamchakta, which in part are completely without forests or have only slight forests. This is also explained by the great difference between the general forest potential (104.2 million hectares) and the area stocked with forest

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Region	Forest Area in millions of hectares	Percent of the total area	Area stocked with forests in millions of hectares	Percent of the total area
Buryat-Mongol ASSR	28.7	84	18.7	57
Chita Oblast	57.6	80	43,2	60
Far Eastern Regions	104.2	37	58.9	21
	180.5		120.8	
USSR	956.3	44	484.2	23

/170/ Transbaykal can be designated as rich in forests although it includes extensive steppes. The forest area or the forest potential, as the Russians designate it, is given at 28.7 million hectares (1936) in the Buryat Mongol ASSR; thus the wooded area covers more than 84 percent of the total area of this republic. However, this total figure of 28.7 million hectares (100 percent) also includes the pastures and meadows closed in by forests (6 percent), and, in addition, the swamps, the bare peaks of the gol'tsy, and boulder areas little grown up (13 percent), and thus only 23.3 million hectares (81 percent) remain for forests themselves. Of this, again, only 18.7 million hectares (65 percent) are stocked with forest, i.e. real, tall forests. Burned areas, windfallen trees, and other things account for the significant difference between the two last figures. These figures show the actual conditions, indicating how one must view in their individual parts the areas designated as general forest potential in the statistical information. These figures also serve at the same time to explain the above table. The percentage of forest is largest in the northern areas, especially in the mountains which surround Lake Baykal, and it is smallest in the south, especially in the area around Kyakhta.

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According to types of trees, the stocked wooded areas are divided as follows:

Conifers:	93 %, with	larches	47 %
		pines	24 %
		cembra pines	16 %
		spruces, firs	6 %
Deciduous trees:	7 %, principally birches, aspen, poplars, and others		7 %

(58.9 million hectares). If we set the general forest potential at 100 percent, then, according to the Atlas of Sources of Energy in the USSR, there should be subtracted from this 1.1 percent for meadows and pastures (1.1 million hectares), 24.7 percent for swamps, bare rock, and boulder slopes which are only slightly grown over (25.8 million hectares), 17.7 percent for bush growth areas, burned areas, windfallen trees, and other (18.4 million hectares), and thus 56.5 percent (58.9 million hectares) remain for the areas stocked with forests. 311

The bulk of the forests are thus divided between the south, i.e., the Amur and Ussuri regions, and the Maritime Krai. This is of very great economic importance, because these forests are thereby closer to the reach of man. In these areas the percentage of forests to the total area is also much greater than the general average. Thus, for example, the percentage of forest land in Khabarovsk Oblast is 66 percent, in the Maritime Krai it is 51 percent, and in the Amur Oblast it is 37 percent. The Oblast of the Lower Amur (28 percent) and the Zeya area (25 percent) have the smallest percentage of forest area here. Sakhalin is among the areas richest in forests. In northern Sakhalin the percentage of forest area is 66 percent, and in southern Sakhalin which was formerly Japanese, it even reaches 85 percent (2.9 million hectares).

The stocked forest areas (not including southern Sakhalin) are divided among the various types of trees as follows: 311 137

Conifers:	84 %, with	larches	36 %
		spruces	27 %
		cembra-pines	12 %
		pines	8 %
		firs	1 %
Deciduous trees:	16%, with	birches	9 %
		oaks	4 %
		lindens	2 %
		ashes, aspens	1 %

The deciduous trees in particular increase toward the south, and accordingly, in comparison with the general averages given in the above table, the percentage of valuable deciduous trees in the Ussuri region and in the southern part of the Maritime Krai is much larger.

The supply of wood in the Far Eastern forests is also larger in comparison with Transbaykal, for in the Far East 70 percent to 80 percent of the trees are ready to be cut down. The total wood supply in the

forests here is estimated to be 6.5 billion cubic meters, of which 5.4 billion cubic meters consist of coniferous wood.

The entire river network of the Amur, with its numerous tributaries which are navigable by ships and rafts, facilitates the exploitation of the forests, and accordingly a significant wood industry has been able to develop in the Amur and Ussuri regions. Khabarovsk and the surroundings are regarded as the base of this industry. From there the bulk of the wood-processing industry extends to the south, following the leading line of the Ussuri and always lying on the tributaries of the Ussuri. Here, from north to south, lie the wood centers of Khor, Dormidontovka, Bikin, Lesopil'nyoye, Lesozavodsk, and Vladimirovka. Another base for the wood industry is formed by Vladivostok and its environs with the towns of Okeanskaya, Shkotovo, Lukyanovka, and Tigrovka. Sovyetskaya Gavan' has very recently become the most important wood-processing center on the coast of the Sea of Japan. Komsomol'sk has received a large works for producing cellulose and paper. Aleksandrovsk on Sakhalin and Petropavlovsk on Kamchatka have in the last few years also been equipped with wood-processing plants.

The total amount of wood cut has increased significantly in comparison with the period before World War II. According to careful estimates, the amount of wood cut during the year of 1952 can be assumed to be 5 million cubic meters in the Buryat-Mongol ASSR, 6 million cubic meters in Chita Oblast, and 30 million cubic meters in the other Far Eastern regions. Considering all the circumstances, this estimate is more likely to be too low than too high.

The Soviet Union has acquired an important supplement to its wood economy by its acquisition of southern Sakhalin. The Japanese had built up an excellent wood industry, which before the war consisted of 68 saw mills and 11 large cellulose and paper factories. Karafuto exported annually to Japan more than 1.2 million cubic meters of wood and many times the value of this wood in cellulose and paper. What importance the wood-processing industry had for the economy as a whole is indicated by the industry's share, in terms of value, in the total production of Karafuto. The share of industry in Karafuto's production was approximately 60 percent, and of this 60 percent the cellulose and paper factories alone provided around 90 percent, and the entire wood-processing industry 92 percent. All this now stands at the disposal of the Soviet Union.

133 Transbaykal/. Material for Doing Research on the Ground in Asiatic Russia. Moscow, 1927.

flat steps, heaped up on one another; they appear easy to climb from the south but break off sharply toward Baykal. However, sharp ridges and pointed, pyramid-shaped mountains appear in the western part, especially in the area of the upper course of the Temnik and the Snezhnaya. Here also lie /211/ /The page itself is blank. Attached to it, however, is a sketch map of Transbaykal: Orographic Scheme./ /212/ the greatest projections of an Alpine type, rich Karbildungen /Karformations/, and other traces of a former glaciation. The bulk of the mountain range has a width of 40 to 70 kilometers and heights of only between 1,200 and 1,600 meters. But the saddles and passes are only 200 meters lower. Outcroppings of basic stone, principally gneiss and granite, occur mostly only on the lower parts of the slopes. The southern and eastern parts present a motley geological picture. Represented here primarily are crystalline limestone and other matamorphic rock, then porphyrite and basalt. In the Khamar-Daban radioactive materials have been determined in addition to other minerals. The bulk of the mountain range is covered [13] with thick forests. Only a few bare gol'tsy project beyond these forests in the eastern part, and only higher Alpine forms project beyond the tree line in the western part. The composition of the forests is strongly influenced by climatic conditions. On the slopes inclined toward Baykal and exposed to the damp and cool northwest winds there is typical Siberian taiga with larches, Siberian stone birch, pines, and others. On the dry southeastern slopes, on the contrary, pines predominate almost exclusively. The flat ridges are covered by an underwood and bush formation.

The Khamar-Daban is separated from the Borgoyskiy Mountain Range on the south by the valley of the Temnik, which flows down to the Selenga. The Borgoyskiy Mountain Range runs parallel to the Khamar-Daban and generally has the same character except for the fact that toward the south it is more heavily broken up /zergliedert/ and with wide, open valleys declines to the extensive graben depression of the Dzhida. In contrast to the Khamar-Daban and the Borgoyskiy Mountains, which are difficult to traverse and not very attractive because of their forest wilderness, the Dzhida valley is relatively well opened up. This goes back to the valley's valuable natural resources. [ns] In the area around the upper course of the river there is, in addition to coal, rich supplies of wolfram and especially of molybdenum. These deposits can be mentioned among the richest in the Soviet Union.

[cf. pp. 238-239--Analyst]

133 peculiarity of these lakes depends on the rock in which they are set. If such lakes lie within eruptive stone, they are as a rule alkali, i.e. they contain and deposit soda (Doroninskoye, Ononskoye, Borgoyskoy
317 Lake). In winter when the climate is dry, soda crystallizes out from the frozen surface of these lakes while strong winds raise up these soda crystals from the ice and deposit them in the immediate and distant environs, thus fostering the mineralization both of the ground water and also of the surface water. In order to extract soda, the soda crystals, which look like a white tinge on the ice, are swept together; thereby 20 to 25 tons of highly concentrated soda lye can be gotten from a hectare of ice surface. In order to foster the crystallization out of the soda, the ice is beaten open so that the lake water comes out under its own pressure through the openings and floods over the surface of the ice. If the lakes lie within Jurassic sediments, then sulphate forms as a rule, especially mirabilite. Deposited under the floor of Selenginskoye Lake is a layer, several meters thick, of sulphate of soda, whose supply is in millions of tons. Alginskoye Lake also belongs in this group. The railroad from Ulan-Ude to Naushki is supposed to lead to the opening up of the important salt deposits in the area of the Gusinoye Lake; the brown coal deposited in the same area is supposed to serve as a basis for this. A large sulphate plant is already in production. At the
361 Gusinoye Lake station a city with more than 10,000 inhabitants has grown from an unimportant village. Coal mines from here supply the railroad. In addition sawmills, brick yards, great dairies, and a fish-canning factory have come into being there. In the fish-canning factory the catch from Gusinoye Lake is processed.

133 The steppe regions which appear in southern Transbaykal vary
•137 greatly in their economic importance. In the most southerly areas the artemisian steppe extends over a very wide area: it extends not only over the valley areas but also over the mountain slopes and mountains of the mountain ranges, which here are mostly low. In its driest parts the ground is often covered only 40 percent to 50 percent with plant growth, and the height of the grasses scarcely reaches 15 to 20 centimeters. These are poor meadows. Toward the north, through the thickening /218/ of the covering of vegetation and through the increase in the grasses, this type of steppe gradually changes into the artemisian grass steppe, in which the grasses become 35 to 40 centimeters high. These steppes are used as meadows in the spring and in the first half of the summer--as long as the vegetation still hasn't withered away under the summer heat. Both types of steppes have developed on chestnut-colored

Both types of steppes[1] have developed on chestnut-colored soil. Within these steppes salt-pans also appear. Further toward the north the soil becomes darker, its humus content becomes greater (3 percent to 5 percent), it changes into the so-called southern black earth, which has only a slight thickness and has a carbonate layer lying near it. The plant growth becomes richer, the contiguousness of the vegetation covering becomes thicker. These are pronounced grazing areas for sheep and goats. For large livestock they are still not sufficient. For such livestock only the meadow steppes can be considered; these meadow steppes often cover large areas along the rivers. To this category belong the Selenga steppes and the valleys of the Dzhida and the Uda. A similar change in the character of the steppes takes place in the direction of the individual mountain chains, with the various types of steppes surrounding the mountain ranges in Isohypsen /isohyetal?/ contours.

The principal importance of the Selenga steppes lies in livestock breeding, which is intensified by the breeding of valuable breeds. The most important regions here are the areas left of the Selenga and the already mentioned valley of the Dzhida. The old yurts of the Buryat have disappeared, and in their place small, permanent, modest wood houses have appeared which in long rows surround the kolkhoz buildings of the concentrated livestock economy. However, in the less favorable grazing areas, as in the Kundara steppe east of Kyakhta, the old Buryat life has been retained. For processing the resulting skins, a rather large leather processing plant has been erected here on the middle Chikoy under the name of Chikoyskiy Zavod. This plant also draws its raw materials from Mongolia. The cultivation of grain is more in the foreground in the other regions on the right side of the Selenga, especially on the lower courses of the Chikoy and the Khilok.

The broad steppe valley of the Uda is the second most important animal breeding area in the Buryat-Mongol ASSR, especially since here numerous Russians have been drawn into animal breeding. In the area around the upper course of the Uda, in the region of the Yeravninsk plain, which is rich in lakes, numerous Russian villages have come into being in which, in addition to slight agriculture, excellent dairy farming is pursued. The largest localities in this region are Gunda and Sosnovo-Ozerskoye.

East of the Selenga, rising from its delta, is the mountain ridge of the Ulan-Burgassy, which forms the watershed between the Uda and the Turka, which empties into Lake Baykal. This mountain range is broader than the Khamar-Daban and has a marked plateau-like surface

[1] [i.e. artemisian and meadow steppes -- Analyst]

industry, metal and machine factories. East of Mogzon the railroad crosses the Yablonovyy Ridge and enters Nerchinsk Daur. 361

Nerchinsk Daur

The Yablonovyy Ridge, which is among the best known mountain ranges in Transbaykal, forms the boundary between the two Daurs. The Yablonovyy Ridge forms the watershed between the rivers flowing into the Amur and those flowing into the Selenga, and thus in the broadest sense it separates the sphere of rivers flowing into the Pacific from the sphere of rivers flowing into the Arctic Ocean. However, this applies only to its southwestern part, for above the Chita River the Yablonovyy shoves in between the Vitim and its tributary the Karenga, and further to the northeast it divides the river area of the Vitim from that of the Olekma, all of which flow toward the north to the Lena. In addition, the Yablonovyy Ridge forms a remarkable climatic and plant-geographic border. The influences of the east Asiatic monsoon penetrate as far as this mountain range and permit deciduous trees to flourish here as representatives of a more moderate climate. West of the ridge deciduous trees are lacking. In this connection the height of the ridge is not so significant as to permit such an influence to be expected. /33 [37]

The Yablonovyy Ridge generally attains a height of only 1,200 to 1,300 meters. Its highest point, which is 1,670 meters high, is the Sarakan, which lies northeast of Chita and which as a golets projects alone from the otherwise very monotonous surface. The relative differences in heights between the valley depressions and the ridges are, however, only insignificant. The railroad crosses the mountain range west of Chita at the Yablonovaya station at /222/ a height of 1,050 to 1,070 meters. The pass here lies only 105 to 125 meters above the valley of the Khilok on the northwest but it is 305 to 325 meters above the bottom of the valley of the Ingoda with the decline to the Ingoda valley also being shorter and steeper. This asymmetrical structure with a steeper southeastern slope and a flat northwestern slope is a characteristic of almost all the mountain ranges in Transbaykal. Obruchev explains this contrast by the effects of the frozen earth by means of solifluction and heavier erosion. The ridges themselves also appear little in the picture of the landscape. From the valley of the Khilok the slope rises slowly to the watershed, which appears to be an almost level rampart. The ridge itself is a more or less plain which is covered with thick forests. Sunk in this plain are saddle-like hollows taken up by swamps. From

000 around the Mogocha station lie extensive gold fields. Thick taiga
●137 lightly inhabited here crosses over all types of land. The raw climate is already strongly perceptible. Permafrost sets in already at a depth of 1 meter. The increasing swampiness of the lower places, and the increasing appearance of gol'tsy which are bare or covered only by bent wood vegation /Krummholzvegetation/, show that here we already find ourselves in the transitional area to the raw forest landscapes of the north.

133 The Baykal Cherskiy Mountain Range accompanies the Yablonovyy Ridge on its southern side and goes in the same direction as the Yablonovyy. East of the Ingoda break-through, the broad, swampy valley of the Chita River forms the border. Then the Cherskiy Mountain Range extends further still to the northeast into the still little known regions around the source of the Nercha. It is to this area, in the opinion of Vosnessenskii, that the 1,971 meter and 2,091 meter high Kropotkin Mountains belong. The course of the Daur Mountain Range, which adjoins the Cherskiy Mountain Range and runs in a parallel line to it, is still not fully clarified. Since the border between the two mountain chains is very vague, the two ranges are often referred to by Russian authors as one range, either under the first or the second name: In the break-through valley of the Ingoda the two mountain ranges can be recognized as separate units. Two tributaries of the Ingoda, the Olenguy on the right and the Kruchina on the left, divide the overall massif. Further toward the east the Daur Mountain Range remains on the left side of the Ingoda and Shilka, crosses /225/ the Nercha and, in the opinion of Gladtsin, could continue into the Shilkinskiy Mountain Range. In their gently rolling surface forms the two mountain ranges show their original form to be almost level. With the later elevation this original plain has been far more valleyed and divided up through increased erosion that the Yablonovyy Ridge has been; and, accordingly, watershed areas in some parts have disintegrated or show a course that is often very winding.

The Borshchovochnyy Mountain Range, the next mountain ridge to the southeast, is to be regarded as the last typical Baykal mountain chain. The Borshchovochnyy begins in the area around the upper course of the Ingoda and of the Onon on the Mongolian border and stretches almost 1,000 kilometers to the east-northeast. With this mountain range, too, the eastern part of its course is more marked and better known that the western part. Immediately after the break through in the Daur Mountain Range, the Borshchovochnyy forces the

1 [i.e. Shilkinsk Mountain region --Analyst]

rolling with gentle rises toward the edges. In the ground lies a granite /33
foundation, over which is liparite and tuff, covered over by a thick layer of lacustrine deoposits, which point to the formation of the steppe basin from a former lake (Gladtsin, 69). Striking is the present day

69. Gladtsin, I.N., Geomorfologicheskii ocherk Zabaykaliya /Geomorphological Sketch of Transbaykal/, Trudy of the Geographical Institute of the Academy of Science, (Moscow, 1938), p. 174.

dryness, which forms a sharp contrast to the forest landscapes surrounding the steppe island. The low position (620 to 680 meters above sea level) as a depression between the contiguous mountain chains, may well be the reason for the special climatic conditions prevailing here. The fertile steppe soil, in many cases designated as black earth, has lead to thick settlement, and, accordingly, the grass steppe only rarely now shows itself in its original dress. The levelness of the steppe is interrupted only by flat, mostly dry valleys with gentle slopes. /224/ In the deeper places there appear damp meadows, often swamps, and also not uncommonly even salt-pans. The slopes of the valleys sloping [137]
to the north are overgrown with birches, poplars, meadows, and bushes, especially if the valleys have the character of a ravine. The transition to the forest landscapes occurs quickly. However, the souther slopes remain free of forests the longest and often appear in contiguous taiga as small forest steppe islands. Toward the Shilka the steppe plain breaks off with a steep, heavily valleyed, high step, which from the river often gives the impression of a mountain land. Next to the dairy and meat economy, the cultivation of grain stands in first place in the agriculture of the steppe island. The economic center is Nerchinsk [361]
with its mill plants, brandy and alcohol distilleries. In terms of transportation Sretensk has a better location, for there the regular Amur shipping begins. West of Sretensk in Kokuy there is a shipyard.

The Transbaykal Railroad runs from Nerchinsk on further on the 496
left shore of the Shilka as far as Kuenga, and from here a branch railroad leads to Sretensk. The main railroad line, which from here on bears the name of Amur Railroad, leaves the Shilka Valley at Kuenga and circumscribes the Shilkinsk Mountain Range in a great arc. Here 316
in the north, lying in a side valley of the Kuenga and connected by a railroad line, are the coal mines of Bukachacha, which in their production stand in first place in Transbaykal, and farther to the east around the Mogocha Station lie extensive gold fields.

133 in height. Thus the Barun-Shebetuy golets, which lies between the Chikoy and its tributary the Chikokon and which is 2,556 meters high, is taller than the Sokhondo, which formerly was considered to be the highest mountain in Transbaykal. Because of their location away from everything and because of the difficult access to these uninhabited regions, they are still very little known. However, the research of Dengin gives a general picture of the landscape, which does not differ from the rest of Transbaykal in its geological-morphological history. The Barun-Shebetuy and also the gol'tsy neighboring it, like most of the mountains in the Sokhondo series, also have a flat surface, and the rest represents a strongly elevated area which is almost a plain. The present-day relief is the result of a very heavy erosion with an important role having been played by the glaciation in the Quarternary period, which is indicated on the Sokhondo by Kare /Karst?/, trough valleys, and moraines and which apparently also gripped the other mountains, which are no less high. Therefore, the same thing has resulted here as is shown by the morphological relationships in the western part of the Khamar-Daban and in the bulk of the Barguzin Mountain Range: everywhere that the diluvial glaciation has gripped a place, the elevated peneplain parts have experienced a much stronger shaping into mountain-like forms, indeed a shaping almost into the Alpine type, than the other areas. Of special morphological significance for the area around the upper course of the Ingoda, the Chikoy, and the Onon, is, in addition, the mighty appearance of intrusive rocks from the Paleozoic to the upper Mesozoic periods and also the appearance of effusive rock such as porphyry, dazite /Daziten/, andesite, and basalt of varying age. These rocks, because of their varying resistance, have contributed significantly to the differentiated shaping of the relief. From all this it is clear that the present-day relief does not correspond with the geological-structural formation and its direction by reason of the prevailing erosion processes of the past and present. The slopes of the [137] mountains are as a rule covered with thick forests. Only on the sides facing south are there treeless steppes, especially, naturally, on the extreme slope facing Mongolia. Pure steppe, for example, crosses the foot of the Sokhondo to a height of 1,200 meters. Birches and aspens, soon joined by pines, constitute the transition to the raw mountain taiga, in which larches and Siberian stone birch predominate. From 1,900 meters on, the transition to mountain tundra begins via bent wood vegetation. As a consequence of mighty storms, the windfallen wood is very heavy. There are Russian settlers only on the outer

off steeply at the Chara valley. The Udokan Mountain Range declines steeply on the north and on the south, in short, on both sides, while the Kalar Mountain Range has its steep decline in the north and declines slowly toward the south. 133

The Kodar Mountain Range, as seen from the Chara valley, represents a single closed mass, its high plain character being clearly recognizable. Through erosion this range has been broken into individual blocks. The Quarternary glaciation has contributed to widening and reforming the valleys. Most heavily cut up is the steep southern slope. The gol'tsy resting on the surface of the massif attain an absolute height of approximately 2,000 meters.

The Udokan Mountain Range in its picture shows a far greater unevenness than the Kodar Mountain Range. The former clod is broken up into irregular parts, which lie at various heights. Here, too, erosion has participated very strongly in the destruction of the original forms. Most strongly torn up is the decline toward the east to the valley of the Olekma. The highest places in the mountain ranges, especially in the area where the Udokan runs into the Kalar Mountain Range, received their present-day face through the Quarternary glaciation, whose traces are visible everywhere and give this part of the mountain range an Alpine appearance. But, in addition, there are also level high plains in the Udokan Mountain Range. In these high plains the original form of the post-Tertiary peneplain is visible.

Aside from the parts where it unites with /236/ the Ukokan Mountain Range, the Kalar Mountain Range generally has more high plains and flat gol'tsy, whose slopes are saturated with pieces of rock and boulders. The Kalar has preserved its plateau-like character better than the Udokan Mountain Range. Toward the south the Kalar slopes slowly to the middle and lower course of the Kalar valley.

The greatest part of the Olekma Highland is overgrown with thick taiga; only the high gol'tsy project beyond these forests and are covered with bent wood or tundra vegetation. The highest mountains are without any form of plant growth. The swampiness is generally very great. It occurs most heavily in the level high plains and the valley depressions. The valley of the Chara especially is very heavily covered with swamps, just as generally the valleys opening toward the north suffer more from much too much dampness than the valleys opening toward the south. However, already here lonely Russian settlements are found, in which agriculture is pursued. Tungus reindeer breeders are known in the valleys of the Kalakan and Kalar. [137] [311]

133 Gold streams are mined on the Ketemakhta, a left tributary of the [316] upper Kalar. Connection with the outside world is provided by [487] mountain paths, which lead toward the south to the Mogocha Station on the Amur Railroad.

The Olekminsk Stanovik comprises the entire area around the upper course of the Olekma and at the same time forms the watershed for the Amur. The entire region is described as a forest-covered plateau, whose general height lies between 950 and 1,000 meters. The river valleys are mostly deeply etched, and lie 80 to 200 meters below the surface of the plateau. The ridge between the Olekma and its right tributary the Tungir bears the name of Dzhaliro-Tungirskiy Mountain Range; otherwise individual designations are not known. The watershed for the Amur forms a flat ridge, which generally is only 800 to 900 meters high. Toward the south, toward the Amur, this ridge gives way very quickly to hilly country, which is interrupted by the broad valley areas of the numerous waters flowing into the Amur. The most important of these is the Amazar, whose valley is also used for a stretch by the Amur Railroad. In contrast to the [237] thick larch forests, which cover the bulk of the Stanovik, the vegetation on the slopes inclined toward the Amur includes numerous deciduous trees and thus shows already a more friendly picture. Gold is the 316 most valuable product of the regions. The river valleys between the upper Tungir and the Amazar are especially rich in gold. These valleys are very well opened up because of their nearness to the railroad. The center of gold mining is the city of Mogocha, which has approximately 30,000 inhabitants. It lies on the railroad on the left side of the Amazar. The alluvial sands of the little rivers flowing into the Amur also have gold and, therefore, from early times have [361] enticed many men who then remained in the land. Accordingly, the entire strip of land between the railroad and the Amur is relatively thickly settled. Worthy of mention here is the valley of the Urusha, which is crossed /237/ by the railroad at the station of the same name. In the vicinity of Urusha brown coal deposits have been determined, and, west of Urusha in the vicinity of the Yerofei Pavlovich station (which has more than 20,000 inhabitants), there are also usable tin deposits.

The Oldoy-Zeya Mountain Country

133 East of the area around the upper course of the Olekma, the

Stanovoy in two places, reports, it is characteristic of the entire structure of the Stanovoy that the plateau in the middle slopes both toward the north and also toward the south in step-shaped breaks, which stretch in a latitudinal direction. Also in terms of landscape there is a difference between the two outer zones. In the north the valleys are mostly filled with forest, and only the deepest places are taken up by moss hills and moss swamps, while the heights appear bare of forest and are covered with rock ruins and boulders or consist of smooth, steeply towering, contiguous bare rock. In the south, on the other hand, /239/ all the heights have thick forests, and only the valley areas are without forest, as a consequence of the greater swampiness. In contrast to the rest of the Stanovoy, the area around the source of the Zeya is also mountainous in the south.

South of the Stanovoy stretches the upper Zeya's broad graben depression which is filled with forests and swamps. Opposite it and coming from the west is the valley of the Gilyuy which is significantly narrower. Both are among the richest gold fields in the Far Eastern regions and are, therefore, better known. The valley floors and even the gentle plateau slopes are mostly covered with a thick layer of moss drenched with dampness, while thick larch taiga grows on the better-drained slopes and elevated places. Deciduous trees occur here only very rarely. As a consequence of the predominant permanently frozen earth, there are often moss hills containing ice cores. These hills are often several meters high, and, if they appear in large numbers, they give rise to a landscape similar to a hill tundra. The crossing of such moss swamps is made difficult by the fact that the frozen earth has gaps, probably because of warm springs, and, accordingly in such places one can sink to unfathomable depths. Where gold mining is pursued, the taiga as a rule is destroyed beforehand by forest fires set off intentionally. The taiga thus gives way to a horrible, plundered landscape, in which there are numerous, deserted huts, which, overgrown with bushes, are falling into ruin and increase still more the despair of the picture. The region does not have larger localities. There are some villages, such as Potekhino and Bryatan in the center of the depression, in which there are larger supply warehouses from which the widely scattered settlements of gold washers are supplied. The extraction of gold, now run by the state, brings rich yields and has made the depression into one of the most important gold areas in the Far East. The gold streams lie along the Zeya and the Gilyuy and their tributaries. The very great swampiness and the existence of

Oldoy and of the Great Urkan. Without a prominent delimitation the 133
Yankan extends out from the Olekminsk Stanovik toward the east and also shows a gradual transition through the dissolution of the plateau-shaped surface, both toward the north to the area around the upper course of the Gilyuy and also toward the south to the Amur. The Tukuringra Mountain Range stands out far more sharply in its isolation, since it forms the demarcation line between two marked depressions, i.e., between the already mentioned depression on the upper Zeya and the Gilyuy in the north and the wide Zeya-Bureya plain in the south, which here projects toward the north as far as the foot of the mountain range. The Tukuringra Mountain Range consists principally of metamorphic rock and in part of gneiss and crystalline slate. It is heavily cut up by extensive erosion and divided into individual massifs, which in part also go back to vertical dislocations. The surface is characterized by the usual plateau form with peaks and gol'tsy set on it. The gol'tsy often stand close to one another and not uncommonly form a middle mountain range landscape with significant differences in height. The general height of the plateau area is 900 to 1,000 meters, while the peaks project 500 to 600 meters beyond this. A great part of the mountain range is covered with thick taiga, and [137]
only the highest gol'tsy are without forests. Accompanying the Siberian types of trees are numerous deciduous trees on the southern slopes. These deciduous trees give a more friendly stamp to the picture of the landscape. However, along with the moderation of the climatic conditions, an extraordinarily thick underwood sets in at the same time. This underwood is very much of a hindrance to man's advance, and, accordingly, despite the lighter colors, the landscape's animosity to cultivation remains here too--a quality which especially distinguishes all these mountainous regions.

From the Dep River, a left tributary of the middle Zeya, the continuation of the chain of mountain ranges toward the east bears the name of Dzhagdy Mountain Range. A cross-connection from it toward the north to the Stanovoy forms the eastern cut-off of the upper Zeya depression and at the same time the watershed between the Zeya and the Uda. This remote mountain barrier is as good as not explored at all. In its central part it is supposed to be 2,000 meters and more high. The Dzhagdy Mountain Range itself continues generally toward the east with a change several times in its direction. /241/ It divides the drainage area of the Uda from the Selemdzha, the largest left tributary of the Zeya, and then goes over into the Bureya Highland, whose

The Zeya-Bureya Plain

This area is the section of the Amur country which is the richest in population and which is the best opened up economically. The easily accessible plain, the milder climate, the fertile soil have from early times /242/ caused a relatively heavy population to settle here, and pursue agriculture. This plain is the granary of the Amur region; 80 percent of the total area under cultivation in the region lies here. [311]

The region falls into two sections: the Amur-Zeya plateau in the west and the great Zeya-Bureya lowland, which extends east of the lower course of the Zeya along the Amur as far as the Bureya Mountain Range.

The Amur-Zeya plateau takes up the western part. This plateau stretches between the Zeya, its tributary the Urkan, and the Amur. The plateau declines slowly from the northwest to the southeast; the interior sections are gently rolling open country; on the other hand, the rivers toward the outside have dug deep gorges. The plateau breaks off sharply toward the lower Zeya and toward the Amur. On the right bank of the lower Zeya the decline becomes 180 to 240 meters deep and, with its heavy gorge formations, gives the impression of a mountain when viewed from the eastern "meadow shore." On the Amur the plateau lies 100 to 120 meters above the river at most, but only very rarely does the plateau come near the river. Here between Chernyayevo and Blagoveshchensk, the Amur valley has four terraces. The lowest one is exposed only when the water is low. Adjoining it with a step up of 4 to 6 meters, and, in places even 8 meters, is the meadow terrace with sandy, gravelly, and muddy deposits. This terrace is considerably wider and is regularly flooded when the water is high. The next middle terrace lies 10 to 20 meters above the normal water level and also breaks off precipitously toward the second terrace mentioned above. Forming a steep bank, this terrace also goes right to the path of the water in many places. There are already settlements in many places on it. The fourth or upper terrace attains a height of 50 to 60 meters and is less clearly set off. The northwestern part of the plateau still has a thick forest covering, but here the percentage of deciduous trees is very considerable. Toward the southeast the thickness of the forests decreases, and they gradually give way to a type of forest steppe. Characteristic of this section are little birch forests and extensive swamps and swamp meadows. Accordingly, livestock breeding predominates among the Russians settled here. [137]

Range, which here goes up to the Amur. Toward the north the plain 133
extends into the river area of the Selemdzha as far as the spurs of the Tukuringra Mountain Range. Vast plains, formed by Tertiary fresh water deposits, warm, damp summers, extensive agriculture, a heavy population, numerous villages and little cities--all these are the main distinguishing marks of this region.

The southern part along the lower courses of the rivers is almost completely level and is often covered with old waters, swamps, and lakes. But even here dry islands rise in long, flat waves in the areas between the rivers. Morphologically, however, these dry islands are scarcely striking in the plains which generally predominate. Instead, something of a change in the vast monotony is brought by the paths of the rivers, all of which have a marked steep right bank which though not high, is still heavily gorged. The left meadow shore, which mostly is covered with swamps, then rises gradually to the watershed areas. The Bureya continues to show this asymmetrical shore formation even far into the mountain country. North of the Tom', a left tributary of the Zeya, the relief changes. It becomes rolling, hilly, and rises gradually toward the north. Here ends the contiguous 133
meadow steppe, which in its natural state has grasses as tall as a man 137.
growing on it. These grasses have brought the steppe the name of "Amur Prairie." This meadow steppe makes way for a magnificent, peculiar forest steppe, in which the hills and high places are covered like islands with oak forests or bushes, while the meadow steppe continues in the lower spots. The dampness of the soil decreases, even though in spots there are often swampy places in the loamy soil. With the further rise toward the north the differences in height become greater, the valley areas become deeper and narrower. Coniferous trees appear on the mountains. The swampiness of the valleys begins to increase again. Slowly the dark taiga takes possession of the entire land, while in the background the rocky peaks of individual gol'tsy already rise from the contiguous greenery.

The significance of the Zeya-Bureya plain is based on the 134
extraordinary fertility of its soil. Tomashevskii (219) has investigated

219. Tomashevskii, I. I. Pochvy iugozapadnoi chasti Zeiskobureinskogo vodorazdela /The Soil of the Southwestern Part of the Zeya-Bureya Watershed/. Works of the Amur Expedition, Vol. XV. Petersburg, 1912.

134 a large part of this region in this connection. In the southwest soils of intensive black color have developed on the heavy loam. This soil is covered with meadows and pastures with high grass. The black color is the reason that the first explorers put this soil in the category of black earth, and even today this soil is designated still as "chernozem" by the native population. But this is not black earth, for it lacks the granular structure, and also the heaping up of carbonates cannot be determined. During the summer the humus horizon is soaked with water, and in horizon B regeneration processes /245/ /Sketch Map of the Southern Part of Khabarovsk Krai and the Maritime Krai:/ 7/1/246/ go forward, which often point to light podsolization. This semi-marshy meadow soil, as Tomashevskii calls it, is, however, not inferior to black earth in fertility and is in a position to produce excellent wheat harvests year after year without any fertilization. As a rule this soil lies in higher places at some distance from the river valley areas, and it covers more than half a million hectares. Somewhat less fertile is a type of soil which is distributed in the deeper depressions and is likewise semi-marshy. This type of soil bears the designation of "miasigi" (kneaded mass /Knetmasse/) among the native population. Here, too, the deep black, upper horizon of soil has developed on heavy loam, but the signs of regeneration are more sharply marked. During the summer dampness horizon B becomes tough, sticky, and viscid like dough, so that, horses sink into the earth and the soil can be worked only with difficulty. In its natural state the "miasigi" is covered predominantly with sedge (Calamagrostis) and moss (Polytrichum) and thus already in its external picture stands
[137] out from the relatively drier soils. Brighter podsol soils take up a large part of the Zeya-Bureya plain, especially toward the north and east, with white birches settling by nature on the heavier soils and black birches and oaks on the lighter soils. These trees were already known to the first Russian settlers as indications of the soil. The bleaching out varies gradually and is generally slight. The fertility of this soil is supposed to be equal to that of black earth. Above all this soil can be easily worked since the drainage is better.

During the dry period the Zeya-Bureya plain recalls the black earth steppes of southern Russia. However, during the rainy period the picture changes completely. Flat basins fill up to become lakes, valleys are flooded, and water even remains standing in level areas. Thus Tomashevskii has been very surprised how anyone could ever have arrived at the thought that black earth has formed here. The

7/1 [Cf. Cat. 116, pp. 282-283 - -Analyst]

conditions the Selemdzha is even traveled as far as Selemdzhinsk. 000
But then begins a land route which is 250 kilometers long and is 487
laborious to travel. At the end this land route reaches the high-lying gold fields with steep ascents.

From the mighty complex of the high plateaus, which surround 133
the area around the source of the Selemdzha, the highland gradually declines toward the south. The surface of the Bureya Mountain Range is only 600 meters high on the upper course of the Amgun and of the Tunguska (a left tributary of the Amur), and only individual gol'tsy rise to heights of 1,000 meters. The Amur Railroad crosses the mountain range in the Lagaraul Pass at a height of 452 meters, and on the Amur itself the highest mountains only reach a height of 200 meters. The mountains here come in a broad front directly to the river, which breaks through the Khingan-Bureya Mountain Range here between Pashkovo and Yekaterino-Nikolskoye in a narrow valley which is 150 kilometers long. The great masses of water are pressed together here by steeply declining, often bare rocks, which come together in places to form a narrow corridor with high, almost perpendicular walls.

The general impression of the Bureya Mountain Range differs little from that of the Zeya Highland. Here, too, the basic forms permit the plateau-shaped surface to be recognized, and projecting from this plateau surface are numerous gol'tsy. However, all parts of the mountain range here show greater effects of erosion, which undoubtedly goes back to the heavier rainfall. Almost all the rivers, at least in their upper courses, flow in narrow, rocky, deeply etched gorges as long as they remain in the sphere of the plateau-shaped elevations. Then the valley areas quickly widen, and, even though they are often still accompanied by steep, rocky slopes, the valleys extend between the gently inclined slopes of the swampy plateau. But also in the lower places there are still individual cones or summits sitting on the plateau.

The vegetation of the Bureya Highland is /251/ unusually 137.
varied. The reason for this lies not only in the changing relief but also primarily in the fact that the elements of three flora regions meet here, namely the East Siberian, Okhotsk, and Manchurian flora regions. In the northern parts of the highland on the mountains and slopes at a height of 600 to 900 meters there are thick forests which consist primarily of Ayan spruce (Picea ajanensis) and fir with white bark (Abies nephrolepsis), with a small number of birches intermixed. The low temperatures, the cool fog, and the strong, damp winds which blow

137 in constantly from the sea in the summer, have given these forests a peculiar appearance. The branches are covered with long lichen, which hang down like beards, and moss grows on the stems as far as the boughs. A thick layer of moss also envelops the earth, and with every step water springs from the damp cushion. In the deeper places and also in the middle part of the highland, larches then appear as forest-formers, and the forests gradually become purely larch forests, and also fill the valley areas as far as the middle courses of the great rivers and press far to the south. The reason for this can be seen above all in the fact that the cold air masses flow down into the valleys and thus prevent the expansion of other types of trees. Only on the lower courses of the rivers flowing toward the south do deciduous trees set in. The larch forests which cover the bulk of the Bureya Highland are economically the most valuable.

316 The valley of the Niman was once among the most famous of the gold fields in the Far East. But the deposits are already exhausted. In their place the gold fields in the area around the upper course of the Bureya have now appeared, but these cannot compete in yield with those of the Selemdzha. The valley of the Bureya serves as the con-
505 necting path to the gold dressing installations. When the water level is good, the Bureya can be used by steamers for 345 kilometers as far as the locality of Chekunda, and occasionally even as far as Umal'ta. From Chekunda down the greater drops already work so strongly against water vessels that from here on the boats as a rule have to be drawn by
487 horses. The last part of the way then is traveled by car or with riding horses and pack horses. An extension of this route toward the east leads over a pass, which is more than 1,000 meters high, to the gold fields on the upper course of the Kerbi, a tributary of the Amgun, which already belongs to the lower Amur. This much-traveled old Bureya gold route has today for the most part lost the importance it once had, since rich deposits of molybdenum and especially of coal have been found in the valley of the upper Bureya and a railroad has been built there.

316 There is molybdenum in the valley of the Umal'ta, a left tributary of the upper Bureya. Here a great molybdenum works has been erected in Ust'-Umal'ta. The hard coal deposits fall into two parts, into the deposit on the upper Bureya and the Tyrma deposit, which are separated from one another only by tectonic occurrences with
496 succeeding erosion. For the /252/ opening up of these deposits a railroad line is being built from Izvestkovyy, which lies west of Birakan on the Amur Railroad. This new railroad line leads over the Bureya

133 meadows on the river, otherwise they are covered with spotty clumps of grass. Where this grass is destroyed, the loose sand shows through, and the wind blows this together into dunes. The shores of the rivers are flat and predominantly covered with meadow, over which the [341] high water extends. The old shore embankments are of greatest importance for human settlement; the broader ridges are as a rule plowed up and used for vegetable gardens, while the areas which become flooded serve as meadows or are used as hay fields. Now and again the entire plain is narrowed down by approaching mountains, or the plain widens to a great breadth with the neighboring depressions adjoining it. In such an area, in wide, swampy surroundings, lies the very flat Lake Bolon' which is 1,200 square kilometers and which is connected to the Amur by a broad water stream. The water level of the lake follows that of the Amur, and when the water is high even a backward flow is to be observed. At Komsomol'sk the hilly mountains come right down to the river on both sides and force the river into one continuous bed. Here ends the contiguous line of the real Amur plain with its magnificently flat relief, /257/ and an irregularly formed landscape begins. Nemerous rows of hills and chains of mountains with heights of up to 500 meters, indeed, even up to 900 meters, make the general picture more lively. The Amur again and again gains in area and widens often like a lake with numerous islands in the broad valley areas and forms in its neighborhood standing water in the form of long lakes in individual basins and old river beds. Despite this, the overall character of the far more broken up Amur plain is determined by the tributaries, which flow into the Amur from both sides in long, often curved, wide valley areas and which increase still more the degree of dividing up of the country. First to be mentioned in this connection is the valley of the Gorin, which extends into a broad depression in the hinterland and which conceals there the big [135] Lake Evoron. Further down are the plains of the Limuri and Pilda; the area around the upper course of these rivers is known for its gold sands. 133 Finally there is the extended valley of the Amgun which is more than • 137 800 kilometers long. The general landscape picture changes its face but little toward the north. Meadow steppes, overgrown with high grasses, are also still typical here, even though the ground becomes ever damper toward the north and the swampiness increases. The same applies also to the appearance of broad-leaved deciduous trees within the forested areas; these forests represent characteristic mixed forests on the lower hills and mountains. In the direction of the

Bureya Mountain Range the deciduous trees disappear as the height increases, and on the mountain range itself and in the Bureya Highland Siberian taiga with Okhotsk strains penetrates generally far toward the south. In the Amur region itself the moderating influence from the south ends with the closed off plain, the climatic conditions become more unfavorable, cooler, and damper; the Sea of Okhotsk dominates here. The meadow steppes change into treeless moss swamps; coniferous forests of an Okhotsk stamp cover the hills, on which here and there the first appearances of high moor formations can be determined. These are signs, which are typical of the northern coastal mountain landscapes. This region already is reckoned as being such a landscape, and it is for this reason that this area along with the drainage area of the Uda will be treated as an independent region.

In the Khabarovsk region the Amur plain is settled over a large area. Wheat, barley, and rye are cultivated here still with good harvests, but toward the north potatoes and vegetables take up an increasing percentage of the land cultivated, since the yield of the grain harvests becomes inferior as a consequence of the dampness of the ground. With sufficient drainage, wide areas could still be won here for the cultivation of grain. Instead the excellent natural meadows serve for breeding of livestock. Toward the north the density of the population decreases rapidly, and approximately from the Mukhen, a right tributary, on, settlement is limited to the river banks on which small villages or individual settlements of Russians or natives are to be encountered at a distance of 10 to 20 kilometers from one another. The settlements for the most part lie on the right bank of the Amur, which is the higher bank. The /258/ left side with its unpredictable high waters is too dangerous for man. In favorable spots larger localities have also developed, such as Troitskoye with its approximately 4,000 inhabitants. In general the settlements are small. The Russian villages can be recognized by their wooden houses. The Gilyak, Goldi, and also here and there Chinese and Koreans, on the other hand, in many cases still occupy mud huts, which are built on the pattern of the Chinese fang-tze. Along with the population, agriculture decreases toward the north. Fishing comes more and more into the foreground, until it becomes the principal occupation on the lower Amur. Here again settlements pile up. According to the state organization of the catching of fish, these settlements are specialized for this trade, and they have heavy immigration. Thus the population grows quickly here, but it is dependent on imports for supplies. All the other areas which

people there. All settlements on the lower courses of the rivers coming 133
from the Sikhote-Alin' suffer in such floods. The harsh continental winter brings the appearance of frost such as is usual in Siberia. The water which is pressed out from rivers through the ice-covering, freezes again and again and makes formations of ice on top of ice, which can become kilometers long. If the water flows under pebble slopes, then the rock fragments are covered with concentric layers of ice, which are up to 10 centimeters thick. The boulders and pebbles then are entirely frozen in, but when the thawing weather comes, they fall into all the heavier movement (Arsenyev).

Despite the fact that the forms vary greatly in detail, the large, round, equalized lines of the mountain range nevertheless remain predominant in the overall impression.

The general forest covering contributes to this. Despite the 137.
careless cutting down of trees in the border regions, this forest covering with its wealth of wood, especially of valuable deciduous trees, represents a still unexploited treasure of the Sikhote-Alin'. But the forest is not of the same quality everywhere. The great dampness hinders growth especially on the coast, where the trees are often crippled and covered with knots. The underwood is then all the thicker, and the natural wilderness is all the more difficult to penetrate. In the interior the forests become swampy easily, and even on the watersheds marshes form.

The picture of the present-day coast owes its origin to the old 133
forms of a heavily cut-up landscape submerged under the sea. Striking is the difference between the marked ria coast on the south and the more compensating coast on the east which has only a few bays. The causes of this morphological phenomenon have been investigated in great detail by Romer (168) and Nowak (134). They show first that

168. Romer, E. Bericht über geographischen Arbeiten im Gebiete des Sichota-Alin-Gebirges. /Report on the Geographical Works in the Area of the Sikhote-Alin' Range/ Anzeiger de Akademie der Wissenschaft Krakow, /Review of the Academy of Science in Krakow/ Series A. Krakow, 1913.

134. Nowak, J. Wissenchaftliche Ergebnisse der Expedition nach dem Sichota-Alin. /Scientific Results of the Expedition to the Sikhote-Alin'/ Krakow, 1913.

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Of the more favorable bays on the northern part of the Sikhote-Alin' coast, only the bay is still to be mentioned on which the already-mentioned harbor of Sovyetskaya Gavan' lies. The natural bay, which is suitable as a landing place, has a vast, flat hinterland, which also has a rather thick agrarian population. Since the completion of the railroad constructed from Komsomol'sk to here, the locality has developed quickly into a city with more than 20,000 inhabitants. It has also received a modern harbor. The processing of wood stands at the center of the economy, but, in addition, ship construction is also pursued. The harbor has a floating dock for ships with up to 5,000 gross registered tons.

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For the rest there are in addition numerous small Russian fishing localities on the coast. These mostly lie at the mouths of rivers, and now, through the bringing together and the building up of the fishing industry, these localities are also experiencing a certain upsurge. The supplying of the localities is done by coastal steamer. Only where wider bays and more extensive valley areas have given the opportunity, have Russian settlers also made their appearance here. These settlers have in places already penetrated 50 kilometers and more into the land.

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The real, vast mountain massif of the Sikhote-Alin' is very sparsely populated; indeed, large sections are uninhabited. In the pathless interior on the upper course of the Bikin and of the Khor, on the Mukhen, Anyu, and upper Khungari, the Tungus Orochi and Olcha are still to be encountered. They wander as nomads with their pointed tents and live exclusively from hunting and fishing. But their number becomes ever smaller. Otherwise only a few Russians and Chinese traverse the wilderness of the lonely valleys and mountains while hunting for fur-bearing animals and the antlers of Isiubr stag. The opportunities for agriculture and the breeding of livestock are slight. Only the broad bottom valleys of the main rivers are suitable for this; here, from the valley of the Ussuri on, Russian settlers are in the process of a slow penetration into the interior, especially on the Khor, Bikin, and Iman, in whose valleys /265/ they can already be found far in among the mountains. It cannot be said how much the collectivization of agriculture has contributed here to a further opening-up of the land or whether a perseverence on the land already won is the consequence of these measure.

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Greater prospects for human activity are offered by the natural resources. Despite the careless cutting down of trees in the border

regions, the Sikhote-Alin' can still, as always, be designated as rich in forests. Planned exploitation of these forests has still not been begun at all. Of still greater significance for the future are the vastly rich resources of the ground. The southeastern part of the Sikhote-Alin' appears to be a true mine for the latter. However, a large part of these supplies has still not been once sufficiently investigated. The prospects for development along mining and industrial lines are always completely favorable, only an opening up in terms of transportation must pave the paths to the sources.

The extreme southern part of the Sikhote-Alin' is generally relatively thickly populated, and it is also better opened up from Vladivostok on. It already belongs more to the cultivated zone, and economically, too, it is so closely connected with the cultivated zone that it will be treated in connection with the Ussuri-Khanka depression.

The Ussuri-Khanka Depression

The western foot of the Sikhote-Alin' is, for its entire length, accompanied by an extensive depression, which stretches from the Gulf of Peter the Great to the mouth of the Amur, thus covering more than 1,300 kilometers. The Ussuri-Khanka depression forms the larger, southern part of this long depression and has a total length of 700 kilometers from the southern end to the mouth of the Ussuri. As compared with the Sikhote-Alin', this depression represents the sunken part of the land step and is accompanined on the west by the step, again elevated, of the east Manchurian mountain range. In the Tertiary period, the entire depression, as Ivanov (83) assumes, was flooded by the sea, and

83. Ivanov, D.V. The Sikhote-Alin' Ridge /in Russian/. Petersurg, 1896.

thus the Sikhote-Alin' projected from the sea as a long, narrow island. Proof of this view has been attained up to now only for the southern part of the depression.

The bulk of the depression belongs to the drainage area of the Ussuri. A flat watershed, which is scarcely perceptible in the countryside and which has an absolute height of only 190 meters above sea level, separates this section of the depression from that section of the depression whose waters drain off toward the south, i.e., the river

133 by a peaked series of hills, which are 50 to 100 meters high. However, individual hills all appear on the floor of the valley, from which they rise with very steep walls. Adjoining this area to the east is a gently rolling and irregular Tertiary hill country, which acts as a transition to the spurs of the Sikhote-Alin'. South of Khanka Lake and also in •[137] the Suyfun depression numerous small oak forests have been preserved which give the picture of the landscape a varied and attractive impression. As a consequence of the good drainage the best agricultural land in the area is to be found in the Suyfun depression. But also in the Tertiary hill country agriculture is making good progress. Here are the /270/ most thickly populated sections of the Maritime Krai, in which, however, the entire region near the coast of the Bay of Peter the Great must be included.

563 342 241 Great Russians above all are settling in the Ussuri depression. Their weathered, colorless log houses which are built of wood, are typical of the settlements in this area. Striking, however, in contrast to their homeland are the relatively flat roofs, which probably indicate the slight covering of snow which they have to bear here. Wheat, oats, and barley predominate in the appearance of their fields, but, in addition to corn, native plants, such as soy beans and perilla, are also appearing more and more. Ukrainians are the predominant settlers in the Khanka depression. As has already been indicated, this is based on historical reasons, since people from the Don above all were used in setting up the Ussuri Cossack formation of 1862. But it is still remarkable that it is Ukrainians who are in the majority in this almost treeless province. The bright color of their whitewashed mud houses dominates the settlements, and between the wheat fields corn comes strongly into the foreground. The Ukrainians here have also taken over for themselves the cultivation of sugar beets, just as they have in their homeland back in Europe. But, in addition, the yellow of the mud huts of the Chinese and Koreans also appears already in the individual settlements and in the village communities. These huts are often enclosed by the same mud walls; and in the flat, dammed-up fields there appears the light green of rice plantings, which are predominant in the damp area to the south of Khanka Lake. Further in the south toward the coast there is no longer a clear separation, but along the coast the Koreans increase. They often dress like Russians, but still they are more often dressed in the traditional white of the native clothing.

The breeding of livestock is pursued in the entire area: cows,

these the wood industry should be mentioned in first place. It is concentrated above all in Shkotovo (approximately 10,000 inhabitants) and Tigrovka (approximately 5,000 inhabitants), both of which lie on the railroad line to Suchan. The wood industry is also concentrated in Okeanskaya (approximately 2,300 /277/ inhabitants) to the north of Vladivostok, where a large wood factory delivers veneer wood for export.

The industry in Vladivostok, like industry generally in the southern Ussuri country, is based on coal, which is on hand here in rich measure. Besides the various smaller coal mining localities, Artem and Suchan should be mentioned here as the principal localities producing coal. Already by 1938 the coal mined in Artem exceeded that mined in Suchan by threefold, and since then coal mining in Artem has been very much further increased. To Artem belong also the two coal districts, Ugol'naya and Trudovaya. The new railroad line, which leads along the western coast of the Bay of Peter the Great to Pos'yet and Kraskino, connects the most important coastal localities, which above all pursue the catching of fish. In the same region there are some sovkhoz for breeding stags at Peschanaya, in Krabbe, and on the Gamova Peninsula.

Sakhalin Island

Sakhalin came to Russia through the treaties of Aigun (1858) and of Peking (1860). However, until 1871 Russia had to share possession of the island with Japan, which in early times had already erected numerous factories in the southern part of the island. Through the unhappy Russo-Japanese War, Russia lost the southern half of the island to Japan. The fiftieth latitude was determined as the boundary line. The outcome of World War II brought the Soviet Union again in possession of the entire island.

Sakhalin covers 80,000 square kilometers and stretches from north to south in an almost meridional direction for about 1,000 kilometers. Once feared as a prisoners' colony of the Czarist empire, the island is notorious for its raw climate. The famous Russian writer A. Chekhov writes, "Sakhalin has no climate at all; the weather is eternally bad and gloomy." The island owes this unhappy reputation to the influence of the cool Sea of Okhotsk, to which the bulk of the island is fully given over. The greatest part of the island is covered with thick forests, which recall the taiga of Siberia. Along the coast

137 appear extensive moss steppes, which have a similar character to that of the tundra, and these regions have an almost polar appearance. The south, on the other hand, has milder traits in places. Since rich
135 coal and oil supplies have been discovered in very recent times and since their exploitation has begun, the island is sliding more and more into the foreground of economic interest; the population is increasing rapidly and is adapting itself to the island. With this the bad reputation of the island is also beginning to change.

133 According to the relief, Sakhalin is divided into two parts: a larger, mountainous section in the south, and a smaller section in the north which is gently rolling to hilly. The mountainous south consists of two mountain chains, which run in the direction of the island and which are separated from one another by a depression stamped as a longitudinal valley. The depression is drained toward the north by the Tym' and toward the south by the Poronay.

/278/ The eastern mountain range, whose highest elevations are Nevel'skiy Mountain (2,013 meters) and Lopatin Mountain (1,680 meters), is more heavily divided up than the western mountain range, which also is lower generally and whose highest point, the Aimi Yama, reaches only 1,641 meters. In its external impression, the eastern mountain range should be designated as more of a ridge mountain range. It consists principally of metamorphic rock, slate, sandstone, and limestone which is similar to marble. These are the same stones as those which build up the border chains of the mainland. These sedimentary stones are in many places permeated by syenite, diabase, andesite, and basalt. Granite, however, is lacking. In terms of age, most of the sediment of the eastern mountain range is reckoned as Paleozoic. Mesozoic is diffused only in places and then is only slightly developed. It is different in the western mountain range. This is built predominantly from Tertiary layers, beside the older rock. Jurassic and Cretaceous also lay claim to a significant proportion. Cretaceous appears especially in the southwestern part and is diffused in the former Japanese territory. Weathering effects are very great because of the damp climate; they affect especially the parts of the mountain range without forests. The sharper forms and the greater variety in the relief can be traced back for the most part to the varying powers of resistance of the different types of rock. The loamy and gravelly slate weather especially quickly.

The Tertiary deposits, which have a wide diffusion in all of Sakhalin, and the Cretaceous sediments are heavily destroyed. The

133 [137] which consists of recent and post-Pliocene deposits and which for the most part is covered by a tundra vegetation interlarded with bushes. The extent of this plain varies, being largest in the north around Sakhalin Bay. The plain ends in a 2 to 6 meter step which is delineated rather sharply everywhere. With this step the hill country then begins. This hill country as a rule bears a thick taiga consisting of spruces and larches. The watershed regions are scarcely perceptible in the relief, but they show up in thicker and higher forest growth. In places the hill country step also goes to the coast itself and then forms a higher, steep slope, which can reach 15 to 26 meters. (207) Taiga and sea

207. Tanfiliev, G.I., Geografiia Rossii: Relief Aziatskoi Rossii /Geography of Russia: The Relief of Asiatic Russia/, (Odessa, 1923), Vol. II, p. 266.

then come very close to one another.

Schmidt Peninsula, so named in honor of the well-known Sakhalin explorer, forms the extreme northern end of Sakhalin. This peninsula forms in miniature a true model of the geological and tectonic structure of the southern section of the island, with even the intrusive phenomena being the same. Here, too, we find an eastern mountain range and a western mountain range with a depression lying between. In the "Tri Brata," the "Three Brothers," the eastern mountain range reaches a height of 708 meters. For the most part this range declines steeply to the sea, and in the north it forms the rocky Cape Elizabeth, the most northerly point on Sakhalin. The western line of mountains, which likewise declines steeply to the sea, attains a height of only 406 meters. The depression lying in between ends in the north with a lake, which is separated from the sea by a narrow tongue of land. On the land narrows which connects Schmidt [315] Peninsula with the main part of the island lies the oil fields of Sakhalin which today have the richest yield.

Sakhalin's coast is generally but little divided up. In contrast to the more contiguous western coast, the northern coast and the east coast represent typical coasts with alluvial lands and numerous fresh-water lakes. Baykal Bay in the northern part of the island represents [505] the largest fresh-water lake. It can be traveled by coastal ships with a draught of up to 3.5 meters. Here on the eastern side of the bay lies Moskal'vo oil harbor which has a railroad connection to the oil region in the eastern part of the peninsula. Still more strongly marked

is the alluvial land character of the eastern coast, on which there is one fresh-water lake after another, almost lined up in a row. All these lagoons are extremely narrow, but they are up to 160 kilometers long. In contrast to the restless sea, these lagoons permit /280/ a protected water traffic along the coast. Sandy places with dune formations, however, are only rarely to be found here. Mostly vast, tundra-like moss steppes, which consist of peat layers up to 15 meters thick, spread out here on the lower courses of the rivers, and are especially extensive on the Tym'. Here, as on the western side of the island, these steppes are excellent meadow lands for reindeer herds.

The difference in the coastal formation between the western and the eastern parts of the island can be traced above all to the prevailing current. On the eastern side the current goes along the coast toward the south. On the western side a current toward the south prevails within the Tatar Sound on the coast of the continent, while on the coast of Sakhalin an opposing northern current predominates. This northern current, however, as Zhdanko (188) has indicated, does not

188. Zhdanko, M. "Isvlechenie iz doklada v zasedanii I.P.G.O." Excerpts from the Material at the Meeting of the Geographical Society in 1915/, Izvestiia of the Imperial Russian Geographical Society, 1915.

run regularly; rather the current changes in connection with the tides; thus there are only tendencies toward an irregular level coast.

Climatically the low northern part of Sakhalin is the most disfavored, since no limitations are set to the raw influences of the Sea of Okhotsk. Therefore, the appearance of the Daur larch is just as typical here as the appearance of the Ayan spruce. Toward the south in increasing measure the taiga also has deciduous trees of the same type mixed in as are characteristic of the Sikhote-Alin'. A consequence of the damp climate is not only the moss areas near the coast but also the meadows which appear in the more protected flood plains of the rivers. These meadows have a very heavy growth of grass, which in places is 3 to 4 meters high. Senecio cannabifolia and Petastes japonicus should be mentioned as among the principal types represented here. In the mountains themselves the stone birch, Betula ermani, appears as the characteristic tree in the heights as do the spruces and pines. In more protected valleys stocks of pure deciduous trees are no rarity. Worthy of note is the appearance of wild Kuril

•137 bamboos (Sasa Kurilensis), which, however, are limited to the western mountain range. This is the only region in the Soviet Union in which bamboo grows wild. In places the bamboo forms a thicket which appears almost tropical and which is difficult to get through.

563 162 231 The native population in northern Sakhalin is very small in number and comprises some thousand Gilyak and Orok. The Gilyak reside more at the mouths of rivers on the coast and provide for themselves by fishing and hunting. The Orok occupy themselves principally with the breeding of reindeer; for this they wander as nomads, even though within narrow borders, between the moss steppes in summer and the border regions of the taiga. The number of reindeer is modest.

563 162 The Russian population in northern Sakhalin has increased many times in number in the last three decades. In 1926 it was estimated to be 20,000, but already before World War II it grew more 361 than 100,000, and since then it has further increased. The population is concentrated essentially in three areas: Aleksandrovsk and the western coastal strip, /281/ which is made prominent economically by its coal mining; then the oil district in the north and on the northeastern coast; and, finally, in the valley of the Tym' and Poronay, which has a smaller percentage of the population. The population here is more agricultural. In general, however, the agrarian economy 433 is still little developed. In the last few years the Soviet administration has striven to ensure food for the industrial population both in the coal oil regions at least in part from local production. To be sure, the areas under cultivation are planted with bread grains, especially in the protected longitudinal valley, where there is a large number of kolkhoz and sovkhoz; however, the production yields only slight surpluses. In the other regions the climatic conditions are too unfavorable to be able to develop cultivation of grain in a grand style here. On 244 the other hand, it is different with the cultivation of potatoes, cabbage, and vegetables. Great successes are to be recorded in this connection. Especially prominent are the high yields of the potato harvests. On the basis of this experience a transition has been made in very recent times--apart from supplying the necessary potatoes for human nourishment--to enlarging the cultivation of potatoes in a planned fashion and to developing the breeding of pigs on a large scale on the basis of this. There are numerous reports of success on this.

361 The capital of northern Sakhalin (the capital of the oblast is now Yuzhno-Sakhalinsk) is Aleksandrovsk, which has approximately 20,000 inhabitants. It is the export harbor of the coal region. The

The harbor has in very recent times been expanded and provided with modern loading equipment. Since the Tatar Sound is very shallow, this equipment had to be moved very far out into the sea. To be mentioned in second place is Okha (approximately 25,000 inhabitants), the most important center of the oil region on the northeastern coast. During the last war the city got a sea harbor of its own, which is supposed to be usable throughout the entire year. South of Okha lies Ekhabi, which has often been mentioned recently for its rising oil production. A railroad and an oil pipe lead from Okha to the oil harbor of Moskal'vo, which lies on the eastern side of Baykal Bay in the northern part of the island. Furthermore, in the past few years there have been established along the coast numerous, permanently inhabited fishing bases, which give life to the entire picture along the coastal strip. The largest part of the interior is still untouched and given over even today to the native population and their primitive economy.

In southern Sakhalin (Karafuto), which was formerly Japanese, the natural landscapes continue as they have already been generally described. The western mountain range, which here has heights of up to 1,375 meters, forms the backbone and stretches to the south beyond the 46th latitude, while the eastern mountain range already ends north of the 49th /282/ latitude. The Poronay Valley ends even before that after it has spread out to a width of 30 kilometers.

As in northern Sakhalin, so here, too, the largest part of the land is covered with primeval forests, which consist of the same type of trees as in the north, only here the percentage of deciduous trees is larger and increases especially on the lower slopes and last spurs of the western mountain range. Even though the climatic conditions became somewhat milder with the southern location, tundra-like moss steppes appear here also. Reindeer breeding is still pursued today by the native population, the Orok and the Tungus.

The population of southern Sakhalin was 332,000 in 1936 and 412,000 in 1940; the increase can be traced for the most part to immigration from Japan. Of the old, native peoples scarcely 2,000 existed; of these the Ainu, who number 1,500, constitute the main part. The rest is divided among Gilyak, Orok, and other Tungus tribes.

The economic importance of southern Sakhalin lies in the wood supply of its forests, in its coal deposits, and in the wealth of fish in the waters near the coast. The Japanese have done much for the economic development of the land and also have attained much. Above all they are to be thanked for the opening up of the land through

Tertiary fault mountain range zone of East Siberia. On the one side, 133
this mountain chain is supposed to have been connected with Sakhalin, and on the other it is supposed to appear again in the Taygonos Peninsula, in the western part of the Penzhina depression, and in the northern part of the Anadyr' region. In the coastal region this chain appears characteristically in the Chutnavar Mountains, which stretch in a wide peninsula from west to east and which are separated from the mainland mountain ranges by an extensive valley which runs in the same direction. Through this valley flows the Kaza Tau'. The mainland mountain ranges referred to above are spurs of the Cherskiy Mountain Range, and with their ridges and the valley areas lying in between, they run into the Kaza-Tau' valley almost perpendicularly; thus in a narrow area the opposing construction appears clearly. For the rest the Tertiary mountain chain appears only in island remains, on the Koni and Pyagina peninsulas and then on Taygonos Peninsula.

East of the Yama begins the Kolyma Mountain Range, which from here on stretches toward the northeast parallel to the coast and then in the hinterland of the Taygonos Peninsula turns toward the north-northeast into the interior of the land. But, in contrast with the Dzhugzhur, the watershed lies far from the coast. The mountain range slopes toward the coast and is broken up into individual parts by numerous long and relatively wide erosion valleys, which run almost perpendicular to the coast. Thus the general impression remains the same as in the west between Okhotsk and the Yama, where the spurs of the Cherskiy Mountain Range meet the coast at the same right angle. However, in the coastal region of the Kolyma Mountain Range the valley areas and also the coastal plain are smaller in size. In the background of the Gizhiga Bay, between the Kolyma Mountain Range and the Taygonos Ridge lies an extensive depression, which is filled with Tertiary deposits. In this depression coal-bearing layers have also been discovered in very [135]
recent times; these layers contain industrially valuable deposits of brown coal and lignite. Natural outcroppings of the productive seams are even to be observed on the coast of Gizhiga Bay.

The northern location comes out more and more in the landscape 137
picture of the coastal region east of Okhotsk. The protected valley areas are as a rule covered with good meadows, which offer /289/ usable pastures for cattle and horses and which are also rich in hay fields. The courses of the waterways are followed by meadow bushes and rows of poplars. Birches set in toward the upper courses. The slopes are mostly covered with larch forests, which become light and low in the heights.

137 The mountain ridges themselves are either bare or have underbrush and reindeer moss growing on them.

361 563 As a consequence of the contrasts between the protected valley areas and the ridges covered with moss tundra, the hinterland of the coast here is occupied far more by Tungus reindeer nomads than the Dzhugdzhur coast. Also, despite the northern location, the number of coastal localities is larger here than there. Russians, however, are to be found here less often. These localities are predominantly occupied by sea Tungus, who, however, all cultivate some vegetables and potatoes in addition to their fishing. Also--a fact that is especially noteworthy--they follow the Russian example and keep cattle and horses. However, the opportunities which are available here for breeding livestock have still not been long exploited, and thus there are the most favorable prospects here, especially since sufficient hay fields are on hand to assure the supply of winter fodder. The most important localities on the coast are Tauysk, Ola, Yamsk, and Gizhiga, all of which lie at the mouths of the rivers of the same [505] names. During the summer, connection between these localities is [487] maintained by small coastal steamers; during the winter the connection is over the so-called coastal route which leads from Okhotsk along the coast to Kamchatka and which is traveled by horse, reindeer, and dog sleds. All of these coastal localities, however, are exceeded in importance by the newly founded city of Magadan, which came into being only shortly before the last world war and which has already far surpassed the old Okhotsk as a harbor.

135 Magadan owes its founding and its rapid growth above all to the hinterland which is rich in natural resources. Here in the area around the upper course of the Kolyma extraordinarily rich gold fields have been discovered; mine gold as well as gold streams have been found. A more exact exploration of the region showed the existence of hard coal and significant supplies of less common elements. The 361 exploitation, which was taken up rapidly, led to the formation of numerous new localities, and thus there are now more than 50 settlements in the upper Kolyma region. The centers of industrial life lie in the area around the source of the Kolyma and on its tributaries, the Berelyakh and Tenka. The most important of the new localities are Orotukan and Khatynakh. For connection with the outside world 491 a highway was built which can be used throughout the year; this highway leads from Ust'-Utinaya to Magadan on the coast. Since the Kolyma is navigable from Ust'-Utinaya on, this highway has at the

133 covered with tundra. Thus from the sea the cape looks like a mighty island, which in its layout vividly recalls the rocks of Gibraltar. The northern and also the southern mountain chain consist predominantly of gneiss and granite. In the Anadyr' Mountain Range Mesozoic rocks are already drawn into the faulting, and south of this range Tertiary layers are also drawn in; thus from north to south one encounters more recent mountain formations.

As a consequence of the easier accessibility the coast of the Chukchi Peninsula is very well explored. Shelagskiy Cape on the eastern side of Chaun Bay is approximately 950 meters high. Further to the east the mountains, which are 600 to 800 meters high, fall back and make free a broad coastal plain with lakes and beach formations full of lagoons. These beach formations, however, are here and there interrupted by round humpy mountains, in which the basic stone /291/ projects from alluvial land plains. At Kolyuchin Bay the mountains again go right down to the sea. Cape Serdtse-Kamen' has heights of [64] from 600 to 900 meters. Eight polar stations have been erected on the coast of the Arctic Ocean on the Chukchi Peninsula to observe the climatic and especially the ice conditions for the benefit of shipping. These stations are distributed over the Chukchi Peninsula at almost equal intervals. All are equipped with radio stations and are supplied for the most part by airplane. The eastern and southern coast of the peninsula, where the mountain ridges often go down to the sea, is richly divided by various bays. From Anadyr' Bay, Kersta Bay penetrates farthest into the land. On a side arm of Kresta Bay lies the highest elevation on the Chukchi Peninsula, the Matachingay. With its 2,800 meters it dominates the mountains surrounding it which are 600 to 800 meters high. At its foot andesite appears, and thus one can probably correctly assume the mountain to be a volcano formation.

137 The bulk of the Chukchi Peninsula is covered with tundra, which makes for a very varied picture according to the relief. Swampy depression tundra, interrupted on the courses of the rivers by pasture and birch underwood, appears only in the valleys and plains. Of greater value is the dry mountain tundra, which is covered with good reindeer moss. The mountain tundra traverses the flat ridges of the mountains and insure the existence of the great reindeer herds of the Chukchi. The higher mountain ranges and mountain peaks are completely without vegetation and are richly sprinkled with rock ruins. Growth of trees occurs very rarely. It is limited to individual, protected spots. Only in the valleys opening toward the south into the Anadyr' region do

smaller forests appear, and then mostly with badly gown and crippled trees. 137

Permanent settlements exist only on the coast and those are mostly on the Bering Sea. In them live the Maritime Chukchee who devote themselves to the catching of fish and sea animals, and in some villages there are also Eskimo. The sections of the sea near the coast of the Chukchi Peninsula are especially rich in walruses, which are among the main animals hunted here. There are no larger localities. Except for officials, no Russians remain here permanently. The interior of the peninsula is occupied by Reindeer Chukchee, a powerful people, capable of resistance, who own great herds and who are depicted as excellent in the breeding of reindeer. However, because of their small number the general density of population is very low and reaches only approximately 0.03 per square kilometer, and thus one can traverse great stretches without encountering a man. Very recently exploration has uncovered valuable natural resources in numerous places. Thus, iron ore, copper, mine gold, graphite, molybdenum, and also hard coal have been found. Hard coal outcroppings are known directly on the coast of Mechigmenskaya Bay and also in the environs of Cape Serdtse-Kamen'. Pieces of hard coal of excellent quality were also found by Chukchee in the interior. /292/ The greatest part of the natural resources determined to date lie on the east coast, since this alone has to date undergone a more exact investigation. The findings to date permit one to assume, on the basis of the same geological structure, that there are more deposits, and thus in them perhaps one side of the future development of the Chukchi Peninsula is indicated.

361 563 [225] [161] 135

The Anadyr' region lies south of the Chukchi Peninsula and is bordered on the west by the Anadyr' Plateau and on the south by the Koryak Mountain Range. The central part of this region is taken up by an extensive depression, which is filled with Cretaceous and Tertiary deposits. For the most part this depression is completely level, but it is not unified, for from the north as from the south mountain ranges project into the depression or rise directly from the plain. To the south of the Anadyr', east of its tributary the Mayn are the Alganskye Mountains, which are up to 500 meters high. The course of all these mountain chains and mountain ridges has still been very little explored in detail.

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The Anadyr' comes down from the plateau of the same name, and in its upper course, where it is up to 170 meters wide, it has the

133 appearance of a large mountain river. The high banks already here have good larch forests. In the area around the upper course of its left tributary, the Belaya, which comes from the Anadyr' Mountain Range in the north, there are supposed to be, on the other hand, only poplar forests and no larches. Above Markovo, the principal locality in the interior of the region, the wide plain begins. At Markovo, more than 500 kilometers from its mouth, the river lies only 25 meters above sea level, and thus the drop from here on is very slight. The middle course of the river, therefore, extends over a width of up to 1.5 kilometers and includes numerous islands. The depression, especially the central parts on both sides of the river, traverse wide, lightly hilly, moss-covered swamp areas with numerous large and small lakes and river courses with water which scarcely flows. There are
•[131] no forests at all in the depression. West of the Belaya and to the southwest of the basin, the swamp areas here and there still have bushes of alders, poplars, and willows, but toward the east this, too, disappears, and here the landscape picture appears monotonous and can be surveyed over a vast area. Also the spurs of the mountain range and the ridges are mostly flat and covered with a slimy moss covering. Often the mountains still have lakes and brightly iridescent swamp areas on their ridges.

131 To the north of the Anadyr' depression, as was already mentioned with the Belaya, only poplar forests occur in protected places. Larches are generally rare there. Only south of the depression do they also /293/ appear. In the west, on the other hand, i.e., more removed from the damp-cool influence of the sea, larch forests penetrate into the valley areas and onto the slopes much farther to the north. The transition from the depression to the mountains occurs in the same way almost everywhere. As a rule, poplars and willows, but rarely birches, set in first on the river courses, and, widening into a type of gallery forest, these trees accompany the river even into the mountain range. For this the trees take up the valley bottom, while the slopes are already traversed by coniferous forests. The slopes exposed to the winds and the higher ridges, however, are without forests.

132 The fact that the Anadyr' depression opens onto the sea permits the influence of the sea to penetrate far into the land. In the west temperatures of -50° are no rarity, while that degree of coldness appears only as an exception in the east. In summer, on the other hand, the coast is cool and rainy, while in the west there are very warm days. The cool fog which envelopes the coast in summer almost never penetrates into the land, however.

133 flows into the Sea of Okhotsk. In comparison with the Anadyr' region
[137] the climate here in the Penzhina lowland is somewhat milder. The inclination of the ground is greater, and thus the moss steppes widely diffused here are not so very swampy: the larger rivers are accompanied by poplar forests almost everywhere. Toward the mountains there is the same alternation in the vegetation picture as there. At the mouth
361 of the Penzhina lies Kamenskoye, where the coastal steamers land.
563 The capital, Penzhina, itself is a small village lying in the middle of a lonely moss steppe in the interior of the region. Koryak constitute the majority of the small population. They are in part sedentary, living as fishermen in the villages, or they wander as nomads with their reindeer herds on the good grazing grounds of the moss steppes
135 In the Tertiary layers, which fill the Penzhina basin, coal-bearing series have recently been found, which also contain lighter lignite in addition to brown coal of good quality. The deposits are said to stretch almost over the entire Penzhina basin.

133 On the east the Penzhina lowland is bordered by a flat mountain ridge, the Penzhina Mountain Range. The very long moss steppe, the Parapolskiy-Dol, whose character is like that of the Penzhina lowland, stretches on the other side of the Penzhina Mountain Range from southwest to northeast. In the south this moss steppe widens and traverses the entire land narrows which connects Kamchatka with the mainland. Here in the middle of the land narrows the moss steppe reaches a height of 155 meters.

The region between the mouth of the Anadyr' in the north and the land narrows in the south is taken up by a still little known central mountain range, which is usually designated the Koryak Mountain Range, after its principal population. This mountain range fills the entire area as far as the east coast, and its waters in the main empty into the Bering Sea. Traversing the land which is mostly formed like a high plateau are three lines of mountain ranges: the Pal-Mal, the Tingeney, and the Rarytkin Ridge. Like the entire Koryak Mountain Range generally, these three belong to the outer zone of the Tertiary faulting belt and are regarded as a continuation of the Kamchatka Mountain Range. In contrast to the interior which is like a high plateau with a general height of 500 meters, the rivers flowing toward the coast are deeply dug in, and thus from the sea an impression more like a mountain range arises. The bulk of the surface is covered with tundra, only the more protected places and valleys have forests. Reindeer-breeding Koryak inhabit the interior and also constitute the population of the /295/ fishing settlements on the coast.

the schools of salmon which regularly press up the river here in immense masses for the spawning period. 133 [136]

The vegetation of Kamchatka, under the influence of the heavier rainfall and the milder temperatures, has another stamp from that of the forest landscapes along the coast of the Sea of Okhotsk, and in the southern part of the peninsula the vegetation even attains an extraordinarily luxuriant character. The bright, shining green of the deciduous trees dominates the picture, and only in the interior of the Kamchatka valley does the dark color of coniferous forests with Daur larch and silver firs appear. There is on Kamchatka no forest of the type of the Siberian taiga. The characteristic tree here is the birch, and in the first place is the stone birch (Betula ermani) with its gray to red bark. However, the birches never come together in thick stocks; rather they always preserve a certain distance from one another, thus giving rise to a kind of park landscape. Along with poplars, alders, and mountain ashes, the birch covers the entire area of the eastern coast. The landscape here is magnificent when the red fruits of the mountain ash glow out between the various greens in late summer. However, the growth of trees ends on the eastern slopes at a height of 300 meters in the north and at a height of 550 meters in the south. The all too great, cool dampness no longer permits the growth of trees. From the interior of the Kamchatka valley, however, the same birch forest rises to a height of 600 to 750 meters. In the underwood of these forests the Kamchatka honeysuckle (Lonicera edula) is especially worthy of note. Its black-brown fruit is collected in August in large quantities as food by the inhabitants. At heights of 300 to 550 meters the birch forest gives way to the already often mentioned bent wood vegetation, which is especially typical for the mountainous sections of Kamchatka. It consists here of a confusion of entwined branches of creeping alder, Siberian stonebirch, and mountain ash, between which individual rhododendron types grow. These bushes cover whole areas and slopes, and are often so matted that a path through them must be made with an axe, unless one wants to follow a bear path; for the bear has withdrawn into this thicket and is still preserved today in larger numbers. At approximately 800 meters this bush formation ends and is replaced by the zone of the Alpine flora, which generally reaches up to a height of 1,400 meters. The glacier line on Kamchatka lies at a height of 1,500 to 1,700 meters, and thus most of the volcanos have a snow cap, many volcanos are half covered by snow caps, and the Klyuchevskaya Sopka even is covered two-thirds by snow caps. 137 ● 133

133 These volcanos, /299/ projecting far beyond the general level, give the landscape of Kamchatka its peculiar picture.

•137 The bottoms of the valleys, if they are not too very swampy and covered with moss, have luxuriant meadows, which appear especially in the southern part of the peninsula and which offer excellent [231] grazing ground for livestock. The introduction of the breeding of livestock has, therefore, attained the greatest measure here, too. To be mentioned especially as characteristic of the landscape picture are the high-growing plants in these regions, especially the umbrella-shaped "sweet grass" (Heracleum tanatum or Heracleum dulce), [243] which grows up to 4 1/4 meters high and develops a stalk 12 centimeters thick. The natives use the juice of this rapidly growing plant [273] to sweeten their food; the Russians earlier extracted alcohol from the plant by fermentation.

133 Entirely in contrast to the forest and park landscapes of the mountain regions which are rich in vegetation, are the tundra-like 137 moss steppes which stretch in a broad zone along the entire western coast. In the east, on the other hand, these moss steppes form only a narrow rim around the bays. Occasionally these steppes occur also in the valleys of the mountain ranges. These monotonous regions are depressingly dismal and gloomy especially when a veil of fog hangs over them and prevents seeing any distance.

161 The population of Kamchatka according to estimates, scarcely numbered 20,000 in 1914, and the native element was in the majority at that time. But after World War I and up to the present the population has multiplied because of the increased immigration of Russians, and by 1945 the population was given at around 100,000. Thus today the Russians are predominant, constituting approximately 80 percent of the total population. Today their number is estimated to be at least 150,000. The sedentary population is divided among three lines of settlements: the east coast, the west coast, and the Kamchatka Valley.

563 The Koryak and Kamchadal constitute the bulk of the native population. The Koryak occupy the northern half of the peninsula and the adjoining mainland between the Penzhina depression in the west and the coast of the Bering Sea on the east. On Kamchatka itself they live on the west coast as far as the Sopochnaya River in the south and in the region around Litke Bay. In the Kamchatka valley itself they are no longer to be encountered. Their region of residence has been brought together into a national okrug, in which they, as well as the Chukchee, enjoy cultural autonomy. The capital of their

with islands.

361 The main locality on the west coast is Bol'sheretsk. It is the
228 center of the crab and salmon fishing industry. All the catches of the numerous fish collection points flow in here for processing. The main fishing regions stretch from Cape Subchatyy to the southern tip of the peninsula, i.e., more in the southern half of the coast. Further to the north lies Palana, the cultural center of the Koryak.

371 In the future development of Kamchatka, exploitation of the natural resources will play an important role. The supplies of coal and oil have already been treated in detail in another place, and thus only a mention may be sufficient here. Also water power rich in energy is available here. Up until now only small water-power stations for supplying agriculture have existed, although there are also vast possibilities here. Thus Kamchatka shows a relatively favorable picture of its economic development to date with further good prospects for the future.

Commander Islands

133 Approximately 250 kilometers east of Kamchatka there arise alone from the sea the Commander Islands. They are separated from the peninsula by a sea channel which is 1,000 meters deep, while toward the Aleutians the floor of the sea sinks down deeper. The island group, which covers 2,150 square kilometers, consists of two large, inhabited islands, Bering Island and Copper Island, and of two small islands, on which only large numbers of sea parrots and aras make their home. The islands are of volcanic origin and consist principally of andesite tuff and basalt.

Bering Island forms in the north a flat, low-lying moss steppe, while a wild highland traverses the southern part. This highland pro-
132 jects up to 670 meters. The damp, cold, constantly foggy and rainy weather (coldest month -4°, July +11°, annual rainfall 500 millimeters) and heavy storms permit only a crippled growth of mountain ash and
• 137 willows to come up. The islands lie at the latitude of Moscow. All the more luxuriant is the growth of grass; the Hercules types, which grow to more than the height of a man, are especially striking.

133 Copper Island received its name from the copper enclosed in the volcanic stone. It is formed from a mountain ridge, which is divided into two parts by a land narrows and which descends steeply to the sea. The mountain ridge is broken up by several cross valleys.

December to the end of April shipping must be stopped completely as a consequence of the ice covering in the area of the islands. Even the most southerly island, Shikotan, is cut off from all traffic with the outside world during this period.

Because of the great stretch of the islands from north to south, vegetation on the Kurils has developed very differently. Of the 768 types of flora established to date on the Kurils, 257 have the base of their development in Japan, and only 45 have the base of their development in Kamchatka and the adjoining mainland. On the northern island tundra vegetation predominates with widely diffused bush covering of Pinus pumila, willow bushes and birch bushes. Trees can develop only in some few protected places. The central islands have the poorest vegetation: these islands mostly are also small and of lesser height, and thus the rawness of the cool sea current can have the strongest effect on them. The southern islands have a relatively rich vegetation. Here (Uruppu, Etorofu, Kunashiri, Shikotan) there already appear forests which are rich in wood and have trees with long trunks. In these forests firs (Picea jezoensis, Picea glehni) and the Sakhalin spruce (Abies sachalinensis) predominate. Mixed in with these trees are oaks (Quercus grosseserrata, Quercus /308/ dentata), beeches (Carpinus cordata), and other deciduous trees. In higher places and in the vicinity of the coast there appear meadow-like grass areas, which occasionally lend an Alpine note to the landscape picture.

Land animals are slight in terms of the number of types. The brown bear and the wolf are in relation to the distribution of the forests. Very numerous are foxes of all types.

The bird world is extraordinarily rich. In this respect the smaller islands above all are distinguished. Migratory birds are rare. They prefer the Salkhalin route for their wanderings. The real wealth of the Kurils are the fish and aquatic mammals, which undoubtedly are poor in terms of the number of types represented but appear in unusual quantities. Among the fish the same types of salmon should be named as were mentioned in the discussion of Kamchatka. Seals stand in first place among the sea mammals, but sea lions and whales also occur. The valuable sea otter has been almost completely exterminated.

The number of permanent inhabitants of the Kurils was around 13,000 before World War II; in the main they were Japanese. Kuril Ainu--the original inhabitants--numbered only several hundred. The